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Contract No. N62474-88-D-5086

Contract Task Order No. 0316

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NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

WORK PLAN

TERRESTRIAL ECOLOGICAL ASSESSMENT/ SCOPING ASSESSMENT AND THREATENED AND ENDANGERED SPECIES SURVEY

FINAL

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October 18, 1995

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1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), proposes conducting a terrestrial ecological assessment/scoping assessment and a threatened and endangered species survey for the U.S. Navy at Naval Air Station (NAS) Alameda. This work plan describes the proposed methodology for the terrestrial ecological assessment/scoping assessment and the threatened and endangered species survey. PRC will use guidelines from the U.S. Environmental Protection Agency (EPA 1992) and State of California (DTSC 1994a and b). PRC will also use the site reconnaissance methodology developed by the Region 9 Biological Technical Assistance Group (BTAG) and summarized by the San Francisco Regional Water Quality Control Board (RWQCB undated memorandum). These documents will be used whenever practical in completing the terrestrial ecological assessment/scoping assessment. This work plan also reflects information discussed with the Navy and state and federal agencies during meetings on November 9, 1994, and January 17 and June 2, 1995. PRC conducted fieldwork during the week of June 5, 1995, and between August 21 and 31, 1995. Fieldwork was conducted according to the draft work plan dated April 3, 1995, and included recommendations from the scoping meetings listed above. This final work plan incorporates recommendations from these meetings and technical review comments from state and federal agencies.

The terrestrial ecological assessment/scoping assessment is the first step of the ecological risk assessment process, and it includes characterization of biota and habitats, identification of contaminants of potential concern (COPC), and identification of potentially complete exposure pathways. The terrestrial ecological assessment/scoping assessment will focus on terrestrial habitats at NAS Alameda; aquatic habitats are being addressed in the ecological risk assessment of operable unit (OU) 4.

The purpose of the terrestrial ecological assessment/scoping assessment is to determine the need for possible future work, such as a phase 1 ecological risk assessment, and to support the base-wide ecological risk assessment for NAS Alameda. The objective of the terrestrial ecological assessment/scoping assessment is to characterize terrestrial habitats at NAS Alameda and formulate potential assessment and measurement endpoints prior to the phase 1 ecological risk assessment. A phase 1 ecological risk assessment may be necessary if further investigation is suggested by the terrestrial ecological assessment/scoping assessment results. The phase 1 ecological risk assessment

would confirm and quantify potential adverse effects to biota at NAS Alameda and would include the following: (1) evaluating existing ecotoxicological test data, (2) comparing chemical exposure concentrations to chemical screening criteria to predict potential adverse effects, (3) performing toxicity tests on surrogate species to confirm adverse effects, and (4) estimating chemical partitioning and tissue concentrations in biota using fugacity modeling, for example.

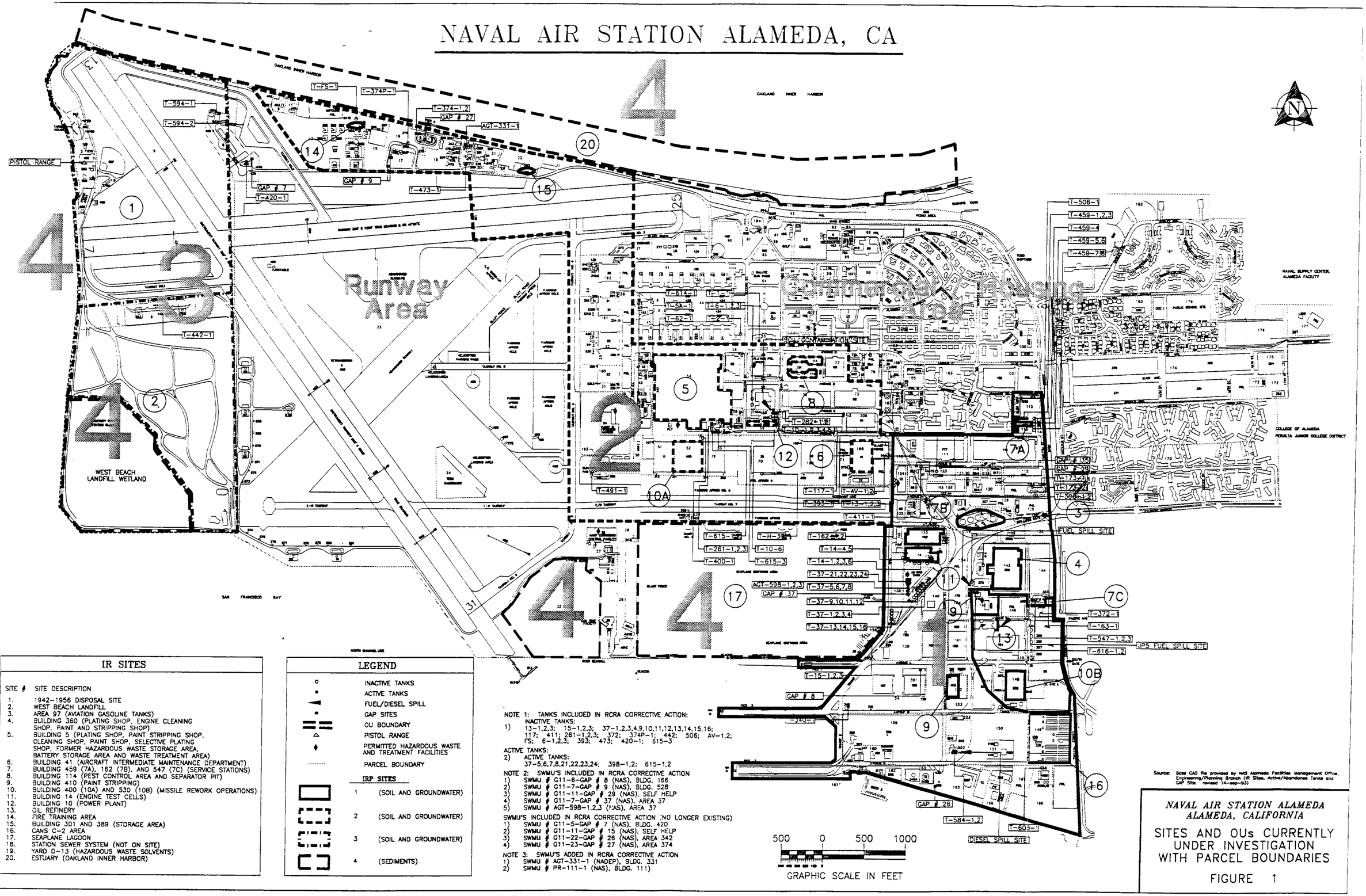
The Navy also proposes conducting a threatened and endangered species survey. The objective of this survey is to determine the occurrence of threatened and endangered terrestrial and aquatic species at or near NAS Alameda. These findings will be used to evaluate potential risks to threatened and endangered species that may use potentially contaminated habitats and other resources at or near NAS Alameda.

This work plan describes the terrestrial ecological assessment/scoping assessment (Section 2.0), including biological characterization (Section 2.1), identification of contaminants of potential concern (Section 2.2), identification of potentially complete exposure pathways (Section 2.3), and the terrestrial ecological assessment/scoping assessment report (Section 2.4). The threatened and endangered species survey, described in Section 3.0, includes a literature review (Section 3.1), a vegetation survey (Section 3.2), a salt marsh harvest mouse survey (Section 3.3), and the threatened and endangered species survey report (Section 3.4). Tables of representative ecological receptors at NAS Alameda are provided in Appendix A. Site reconnaissance methodology and forms used to record field data are presented in Appendix B. A table of threatened and endangered species expected to occur at NAS Alameda is presented in Appendix C.

2.0 TERRESTRIAL ECOLOGICAL ASSESSMENT/SCOPING ASSESSMENT

Figure 1 shows the locations of OUs 1, 2, 3, the Runway Area, and OU 4, and the potential hazardous waste sites at NAS Alameda. The terrestrial ecological assessment/scoping assessment will characterize habitats and biota that may be currently affected by site-related contaminants from OUs 1, 2, 3, and the Runway Area. PRC will also characterize habitats and biota in upland areas adjacent to the wetlands in OU 4. The information gathered from the characterization of the uplands in OU 4 will also be used to support the OU 4 ecological risk assessment. OUs 1, 2, and 3 consist of the 18

NAVAL AIR STATION ALAMEDA, CA



IR SITES

SITE #	SITE DESCRIPTION
1.	1942–1956 DISPOSAL SITE
2.	WEST BEACH LANDFILL
3.	AREA 97 (AVIATION GASOLINE TANKS)
4.	BUILDING 360 (PLATING SHOP, ENGINE CLEANING SHOP, PAINT AND STRIPPING SHOP)
5.	BUILDING 5 (PLATING SHOP, PAINT STRIPPING SHOP, CLEANING SHOP, PAINT SHOP, SELECTIVE PLATING SHOP, FORMER HAZARDOUS WASTE STORAGE AREA, BATTERY STORAGE AREA AND WASTE TREATMENT AREA)
6.	BUILDING 41 (AIRCRAFT INTERMEDIATE MAINTENANCE DEPARTMENT)
7.	BUILDING 459 (7A), 162 (7B), AND 547 (7C) (SERVICE STATIONS)
8.	BUILDING 114 (PEST CONTROL AREA AND SEPARATOR PIT)
9.	BUILDING 410 (PAINT STRIPPING)
10.	BUILDING 400 (10A) AND 530 (10B) (MISSILE REWORK OPERATIONS)
11.	BUILDING 14 (ENGINE TEST CELLS)
12.	BUILDING 10 (POWER PLANT)
13.	OIL REFINERY
14.	FIRE TRAINING AREA
15.	BUILDING 301 AND 389 (STORAGE AREA)
16.	CANS C-2 AREA
17.	SEAPLANE LAGOON
18.	STATION SEWER SYSTEM (NOT ON SITE)
19.	YARD D-13 (HAZARDOUS WASTE SOLVENTS)
20.	ESTUARY (OAKLAND INNER HARBOR)

LEGEND

- INACTIVE TANKS
- ACTIVE TANKS
- FUEL/DIESEL SPILL
- GAP SITES
- OU BOUNDARY
- PISTOL RANGE
- PERMITTED HAZARDOUS WASTE AND TREATMENT FACILITIES
- PARCEL BOUNDARY

IRP SITES

1 (SOIL AND GROUNDWATER)

2 (SOIL AND GROUNDWATER)

3 (SOIL AND GROUNDWATER)

4 (SEDIMENTS)

NOTE 1: TANKS INCLUDED IN RCRA CORRECTIVE ACTION:

INACTIVE TANKS:
1) 13-1,2,3; 15-1,2,3; 37-1,2,3,4,9,10,11,12,13,14,15,16; 117; 411; 261-1,2,3; 372; 374P-1; 442; 506; AV-1,2; FS; 6-1,2,3; 393; 473; 420-1; 615-3

ACTIVE TANKS:
2) ACTIVE TANKS: 37-5,6,7,8,21,22,23,24; 398-1,2; 615-1,2

NOTE 2: SWMU'S INCLUDED IN RCRA CORRECTIVE ACTION
1) SWMU # G11-6-GAP # 8 (NAS), BLDG. 166
2) SWMU # G11-7-GAP # 9 (NAS), BLDG. 528
3) SWMU # G11-11-GAP # 29 (NAS), SELF HELP
4) SWMU # G11-7-GAP # 37 (NAS), AREA 37
5) SWMU # AGT-598-1,2,3 (NAS), AREA 37

SWMU'S INCLUDED IN RCRA CORRECTIVE ACTION (NO LONGER EXISTING)
1) SWMU # G11-5-GAP # 7 (NAS), BLDG. 420
2) SWMU # G11-11-GAP # 15 (NAS), SELF HELP
3) SWMU # G11-22-GAP # 26 (NAS), AREA 342
4) SWMU # G11-23-GAP # 27 (NAS), AREA 374

NOTE 3: SWMU'S ADDED IN RCRA CORRECTIVE ACTION
1) SWMU # AGT-331-1 (NADEP), BLDG. 331
2) SWMU # PR-111-1 (NAS), BLDG. 111)

500 0 500 1000

GRAPHIC SCALE IN FEET

Source: Base CAD file provided by NAS Alameda Facilities Management Office, Engineering/Planning Branch (IR Sites, Active/Abandoned Tanks and GAP Site; revised 14-sep-93)

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

SITES AND OUs CURRENTLY UNDER INVESTIGATION WITH PARCEL BOUNDARIES

FIGURE 1

ALAM-AI.DWG REV 3/2/94 PLOT 1=500

potential hazardous waste sites listed below. OU 4 includes surface water (marshes, Oakland Inner Harbor, Seaplane Lagoon, and San Francisco Bay) at or adjacent to NAS Alameda. Potential ecological risks posed by future reuse at NAS Alameda will be addressed in the terrestrial ecological assessment/scoping assessment. Future areas of concern may be identified through the COPC screening process and in the future reuse plan for NAS Alameda. Source areas that currently exhibit incomplete exposure pathways to terrestrial ecological receptors will be evaluated in terms of the proposed future reuse plan, potential ecological receptors, COPCs, and potentially complete exposure pathways.

Potential hazardous waste sites at NAS Alameda include the following:

OU 1: Site 3 - Area 97 (aviation gasoline tanks)

Site 4 - Building 360 (plating shop, engine cleaning shop, paint and stripping shop

Site 7A - Building 459, Navy Exchange Fuel Station

Site 7B - Building 162, Service Station

Site 7C - Building 547, Service Station

Site 9 - Building 410, Paint Stripping

Site 10B - Building 530, Missile Rework Operations

Site 11 - Building 14, Engine Test Cells

Site 13 - Oil Refinery

Site 16 - CANS C-2 Area

Site 19 - Yard D-13 (hazardous waste solvents)

OU 2: Site 5 - Building 5 (plating shop, paint stripping shop, cleaning shop, paint shop, selective plating shop, former hazardous waste storage area, battery storage area, waste treatment area)

Site 6 - Building 41 (aircraft intermediate maintenance department)

Site 8 - Building 114 (pest control area and separator pit)

Site 10A - Building 400 (missile rework operations)

Site 12 - Building 10 (power plant)

Site 14 - Fire Training Area

Site 15 - Buildings 301 and 389 (storage area)

OU 3: Site 1 - 1942 to 1956 Disposal Site

Site 2 - West Beach Landfill

The specific objectives of the terrestrial ecological assessment/scoping assessment at NAS Alameda are discussed below.

2.1 BIOLOGICAL CHARACTERIZATION

A site reconnaissance of the significant terrestrial habitats and biota is proposed to supplement existing data from previous studies at NAS Alameda. During the site reconnaissance, PRC will use the site walk protocol developed by the Region 9 BTAG and summarized by the San Francisco Regional Water Quality Control Board (RWQCB undated) as a guide.

Biological characterization will be performed by qualified PRC scientists including experienced field biologists. Steve Clark is the PRC team leader for the terrestrial ecological assessment/scoping assessment and threatened and endangered species survey. Mr. Clark is a zoologist and environmental scientist with more than 10 years of project management and support experience in ecological risk assessment, endangerment assessment, threatened and endangered species surveys, and biological surveys. Mr. Clark is certified in U.S. Fish and Wildlife (FWS) Habitat Evaluation Procedures (FWS 1980a and b; 1981a and b) and has been trained in U.S Army Corps of Engineers Wetland Delineation guidelines (COE 1987). The project team also includes Debbee Modrell, a vegetation ecologist specializing in California plant communities who has 6 years of research experience. Jody Brauner, another project team member, is an ecologist with 2 years of experience in ecological risk assessment and biological surveys. Ms. Brauner has also been trained in U.S Army Corps of Engineers Wetland Delineation guidelines (COE 1987). PRC estimates that the operable units will be assessed over a 4- to 6-day period to collect site-specific data for the terrestrial ecological assessment/scoping assessment report and the threatened and endangered species survey report.

As described in the following subsections, the biological characterization of terrestrial habitats will result in a description of major habitat types and characteristic species (potential receptors) observed during the site reconnaissance and expected at NAS Alameda. These data will be used to develop potential assessment and measurement endpoints and to focus the ecological risk assessment process.

2.1.1 Identification of Habitats

During site reconnaissance at OUs 1, 2, 3, the Runway Area, and wetland areas in OU 4, the survey team will delineate terrestrial habitats and determine relative habitat coverage and dominant vegetation at NAS Alameda. Adjacent open waters in San Francisco Bay, the Oakland Inner Harbor, the Seaplane Lagoon, and inundated portions of the wetland areas will be addressed in the aquatic ecological risk assessment. The seasonal pools in the northern portion of NAS Alameda have been evaluated by the Navy using the U.S. Army Corps of Engineers Wetland Delineation guidelines (COE 1987), and the results of the wetland delineation are summarized in a Navy report (Navy 1994). The terrestrial ecological assessment/scoping assessment will also address the seasonal pools.

Existing literature (Environmental Science Associates 1987, Golden Gate Audubon Society 1994) is being reviewed to develop field data sheets that list terrestrial plant species that are expected to occur at NAS Alameda. The field data sheets will also tentatively identify OUs at NAS Alameda where potential terrestrial plant species might occur. "A Guide to Wildlife Habitats of California" (Mayer and Laudenslayer 1988) or a comparable reference will be used during habitat characterization at NAS Alameda. Wetlands will be classified using available wetland delineation reports and results from the site reconnaissance. Habitat characterization will include industrial, residential, and landscaped areas at NAS Alameda. Potential terrestrial plant species occurring at NAS Alameda are listed in Appendix A. The table in Appendix A will be expanded after the site reconnaissance has been completed and will be presented in the terrestrial ecological assessment/scoping assessment report in the format shown. Site reconnaissance methodology and forms used to record field data are presented in Appendix B.

PRC has made some preliminary determinations about terrestrial habitat types and areas of coverage based on a site tour on November 7, 1994. The following information will help focus the habitat delineation effort. In OU 1, PRC expects to find an industrial setting with primarily covered by concrete and asphalt pavement, with some grasses, shrubs, and trees. In OU 2, PRC expects to find a less concentrated industrial setting with concrete and asphalt pavement, grasses, shrubs, and trees. In OU 3, PRC expects to find an open, mostly unpaved area consisting of nonnative grasses, old landfill areas (Sites 1 and 2), and a shooting range. In the Runway Area, nonnative grasslands are the dominant habitat with portions covered by paved runways and the California least tern sanctuary.

In the terrestrial portion of OU 4, PRC expects to find brackish and saline wetlands mostly consisting primarily of grasses, rushes, and pickleweed.

A PRC field biologist will review a list of habitats protected by the State of California prior to the field survey to determine the occurrence of protected habitats at NAS Alameda. Aerial photographs and other supplemental information will be reviewed prior to the field survey to focus the habitat delineation effort further and to develop a more comprehensive characterization of habitats at NAS Alameda. Potentially sensitive habitats within a 1-mile radius of NAS Alameda will also be identified. During the field survey, PRC will identify dominant terrestrial plants at NAS Alameda using references such as the following:

- *The Jepson Manual, Higher Plants of California* (Hickman 1993)
- *Common Wetland Plants of Coastal California* (Faber 1993)
- *Common Riparian Plants of California* (Faber and Holland 1992)

PRC's field biologists will also use taxonomic keys to identify observed plant species in the field, if necessary.

Habitat data will be compiled in table format that will include a list of habitat types and relative areas of coverage. The data will be used to identify habitats potentially impacted by site-related contaminants and to evaluate the occurrence of potential ecological receptors. A habitat map and associated data will be presented and discussed in the terrestrial ecological assessment/scoping assessment report (see Section 2.4).

2.1.2 Identification of Potential Receptors

Existing literature has been reviewed to develop a list of representative ecological receptors at NAS Alameda (see Appendix A). This table will be expanded after the site reconnaissance has been completed and will be presented in the terrestrial ecological assessment/scoping assessment report in the format shown in Appendix A. The California Department of Fish and Game (CFG) Natural Heritage Division has been contacted for current lists of special animals and plants. Information

obtained from the CFG will also show topographic map locations of habitats suitable for special species at NAS Alameda and within a 1-mile radius. The Natural Diversity Database (NDDB) of "Special Animals" (CFG 1994) and "Special Plants" (CFG 1993) was used to prepare the species lists included in Appendix A. The NDDB was also queried for natural history information on expected bird species. References such as *California's Wildlife*, Volumes 1, 2, and 3 (Zeiner and others 1988, 1990a and b) or comparable references will be used to further evaluate potential ecological receptors.

During the site reconnaissance, PRC will identify terrestrial species observed at OUs 1, 2, 3, the Runway Area, and at the upland areas in OU 4. The field team will identify terrestrial animals and tracks, burrows, scat, or other animal remains, using field guides such as the following:

- *A Field Guide to Western Reptiles and Amphibians* (Stebbins 1985)
- *Field Guide to the Birds of North America* (National Geographic Society 1987)
- *Mammals of the Pacific States: California, Oregon, and Washington* (Ingles 1965)
- *Animal Tracks* (Murie 1974)

During a 1- to 2-day survey period at each operable unit, PRC will observe and identify potential receptor species in the morning, midday, at dusk, and at times of increased animal activity. Near nesting bird colonies, identification of receptors will take place during the morning and at dusk to avoid disturbing nesting birds with eggs or young during the hottest part of the day.

The terrestrial ecological assessment/scoping assessment will also address the use of terrestrial habitats by waterfowl, wading birds, shore birds, and pelagic seabirds that feed near NAS Alameda, in adjacent open waters in San Francisco Bay. Protected terrestrial and aquatic species at NAS Alameda will be identified during a threatened and endangered species survey. This survey is discussed in Section 3.0 of this work plan.

Data for potential terrestrial receptors will be compiled in table format and will include expected and observed species and relative occurrence for each operable unit. The data will be used to identify potential terrestrial receptors that may be affected by site-related contaminants and to formulate

potential assessment and measurement endpoints. The data will be presented and discussed in the terrestrial ecological assessment/scoping assessment report (see Section 2.4).

2.2 IDENTIFICATION OF CONTAMINANTS OF POTENTIAL CONCERN

PRC will identify COPCs based on site-specific history of use and laboratory results from previous investigations, such as the remedial investigation at NAS Alameda. These data will be obtained from the installation restoration database. A list of contaminants will be tabulated, and the table will indicate whether historical site use or laboratory results are the basis for including the contaminant on the list of COPCs. If laboratory results are used, the table will specify the number of samples analyzed, the frequency of detection, the method detection limit, and the minimum, maximum, and mean concentrations. Retained COPCs will include those chemicals with concentrations exceeding background values (if available) and ecological screening criteria being developed by the Navy in cooperation with EPA Region 9 BTAG.

Contaminated or potentially contaminated environmental media and potentially affected habitats will be described in the terrestrial ecological assessment/scoping assessment report. PRC will consider contaminants that are lipophilic and have a tendency to bioaccumulate or bioconcentrate and biomagnify. Nutrients that may be toxic to biota will also be evaluated terrestrial ecological assessment/scoping assessment report. Results from COPC screening will be used during the ecological risk assessment process to evaluate which site-related chemicals could pose risks to biota through potentially complete exposure pathways.

2.3 IDENTIFICATION OF POTENTIALLY COMPLETE EXPOSURE PATHWAYS

During the site reconnaissance, PRC will identify potentially complete exposure pathways within OUs 1, 2, 3, the Runway Area, and the upland areas in OU 4. Potentially complete exposure pathways are known routes of chemical exposure, such as dermal contact with contaminated soil or ingestion of contaminated food. Fate and transport of specific contaminants will not be confirmed or quantified during the terrestrial scoping assessment for NAS Alameda. After further evaluation and modeling, some potentially complete exposure pathways identified in the terrestrial ecological assessment/scoping assessment may be incomplete for some chemicals. Chemical-specific fate and

transport modeling may be performed, and complete exposure pathways may be confirmed in later phases of the ecological risk assessment process, such as the phase 1 ecological risk assessment.

PRC has made some preliminary determinations about potentially complete exposure pathways based on a site tour on November 7, 1994. The following information will help focus the process of identifying potentially complete exposure pathways. Dermal exposure is expected to be the primary exposure route in OU 1. However, PRC expects to find mostly incomplete exposure pathways due to concrete and asphalt pavement covering most of the ground surface in OU 1. In OU 2, exposure through dermal contact and the food chain are expected to be the main exposure routes. PRC anticipates an increased likelihood of encountering complete exposure pathways at OU 2 because more ground surface is exposed. In OU 3, exposure through dermal contact and the food chain are expected to be the main exposure routes. PRC anticipates a high likelihood of encountering potentially complete exposure pathways because the ground surface is mostly unpaved in OU 3. In OU 4, PRC expects to find mostly unpaved ground surfaces and potential exposures through dermal contact and the food chain.

Media-specific chemical data from the remedial investigation and the potentially complete exposure pathways identified at NAS Alameda will be used to evaluate the magnitude, duration, and frequency of chemical exposure to potential receptors. This evaluation will be performed for potential receptors in multiple trophic levels such as detritivores, herbivores, omnivores, insectivores, and carnivores.

Exposure pathway data will be described in table format and will indicate the potential for direct exposure with potential contaminants and contaminated media and potential indirect exposure through the food chain. Conceptual models will be developed for each operable unit and will help focus the ecological risk assessment process by determining which exposure pathways, if any, may be of concern to biota at NAS Alameda. Exposure pathways will be assumed to be complete unless shown otherwise by results from the site reconnaissance and the site conceptual model. Exposure pathway data and conceptual models will be presented and discussed in the terrestrial ecological assessment/scoping assessment report (see Section 2.4).

2.4 TERRESTRIAL ECOLOGICAL ASSESSMENT/SCOPING ASSESSMENT REPORT

Each operable unit will be characterized and objectively screened in the terrestrial ecological assessment/scoping assessment report, independent of the other operable units. Field survey data will be compiled in the report and will include a habitat map, current and historical land use maps, summaries of potential receptor species (see examples in Appendix A), COPCs, potentially complete exposure pathways, and a photographic log. The report will identify potential assessment and measurement endpoints and will evaluate the need for and scope of further investigation or action. A phase 1 ecological risk assessment work plan may be required if further investigation is suggested by the terrestrial ecological assessment/scoping assessment results. Results of the terrestrial ecological assessment/scoping assessment will eventually be integrated into a base-wide ecological risk assessment for NAS Alameda.

3.0 THREATENED AND ENDANGERED SPECIES SURVEY

A threatened and endangered species survey is proposed to determine the occurrence of listed and proposed threatened and endangered terrestrial and aquatic species at or near NAS Alameda. The survey will identify protected species that may be affected by potential remedial actions at NAS Alameda.

The use of NAS Alameda by listed and candidate threatened and endangered terrestrial and aquatic species will be characterized by performing a literature review (see Section 3.1) and field surveys for threatened and endangered vegetation (see Section 3.2) and the federally-endangered salt marsh harvest mouse (see Section 3.3). The field surveys are intended to address uncertainties associated with the occurrence of threatened and endangered species, particularly terrestrial plants and the federally-endangered salt marsh harvest mouse at NAS Alameda. The field surveys will supplement existing literature from previous studies of many threatened and endangered species expected at NAS Alameda, such as the California least tern. Data from the threatened and endangered species survey will be considered with the results from the terrestrial ecological assessment/scoping assessment, the OU 4 ecological risk assessment, and the base-wide ecological assessment.

3.1 LITERATURE REVIEW

A review of published research literature will be conducted and the following sources will augment the data obtained from the research literature:

Government

- National Oceanic and Atmospheric Administration
- Bay Conservation and Development Commission
- Golden Gate Parks and Recreation
- California Department of Fish and Game
- U.S. Fish and Wildlife Service
- National Biological Survey
- San Francisco Estuary Project

Nonprofit Organizations

- California Native Plant Society
- Golden Gate Audubon Society
- Point Reyes Bird Observatory
- The Nature Conservancy
- Aquatic Habitat Institute
- Marine Mammal Center

Academic Organizations

- Moss Landing Marine Laboratory
- California Academy of Sciences
- University of California, Berkeley
    - Department of Integrative Biology
    - Museum of Vertebrate Zoology

These sources will be queried about protected species known to occur in terrestrial or aquatic habitats at NAS Alameda. During this process, additional resources will be identified and queried for threatened and endangered species data applicable to this project.

3.2 VEGETATION SURVEY

A vegetation survey at NAS Alameda was performed during the week of June 5, 1995 to identify threatened and endangered plant species in OUs 1, 2, 3, the Runway Area, and in the terrestrial portions of OU 4. The vegetation survey will evaluate vegetation transition zones within these operable units that may exhibit increased plant species diversity. The vegetation may be performed during site reconnaissance activities performed for the terrestrial ecological assessment/scoping assessment proposed for the spring of 1995.

As discussed in Section 3.1, PRC will perform a literature review to obtain information regarding threatened and endangered plant species potentially present at NAS Alameda. PRC has identified the following candidate species that are expected near the wetland areas, based on a FWS memorandum (1994).

- Point Reyes Bird's Beak (*Cordylanthus maritimus palustris*)
- Santa Cruz Tar Plant (*Holocarpha macradema*)
- Kellogg's Horkelia (*Horkelia cuneata sericea*)
- Contra Costa Goldfields (*Lasthenia conjugens*)
- Adobe Sanicle (*Sanicula maritima*)

Once the background review is complete, PRC field biologists will survey habitats that may support threatened and endangered plant species at NAS Alameda. Vegetation experts (PRC 1994a, b, and c) were consulted about appropriate survey methodologies for threatened and endangered plants and the FWS has concurred with PRC's proposed vegetation survey methodology at NAS Alameda (PRC 1995a).

PRC will use the following approach during the vegetation survey. Habitats suitable for potential special plants will be searched and each vegetative community will be bisected by an observational transect. The precise number and placement of the observational transects will be determined in the field and will be based on the size and relative heterogeneity of the vegetative communities. Two field biologists will qualitatively evaluate each vegetative community and transition zone by searching

for special plants identified before the survey. Vegetative transition zones encountered between distinct plant communities will be evaluated by establishing observational transects 5 to 10 feet apart in order to sufficiently characterize the transition zone.

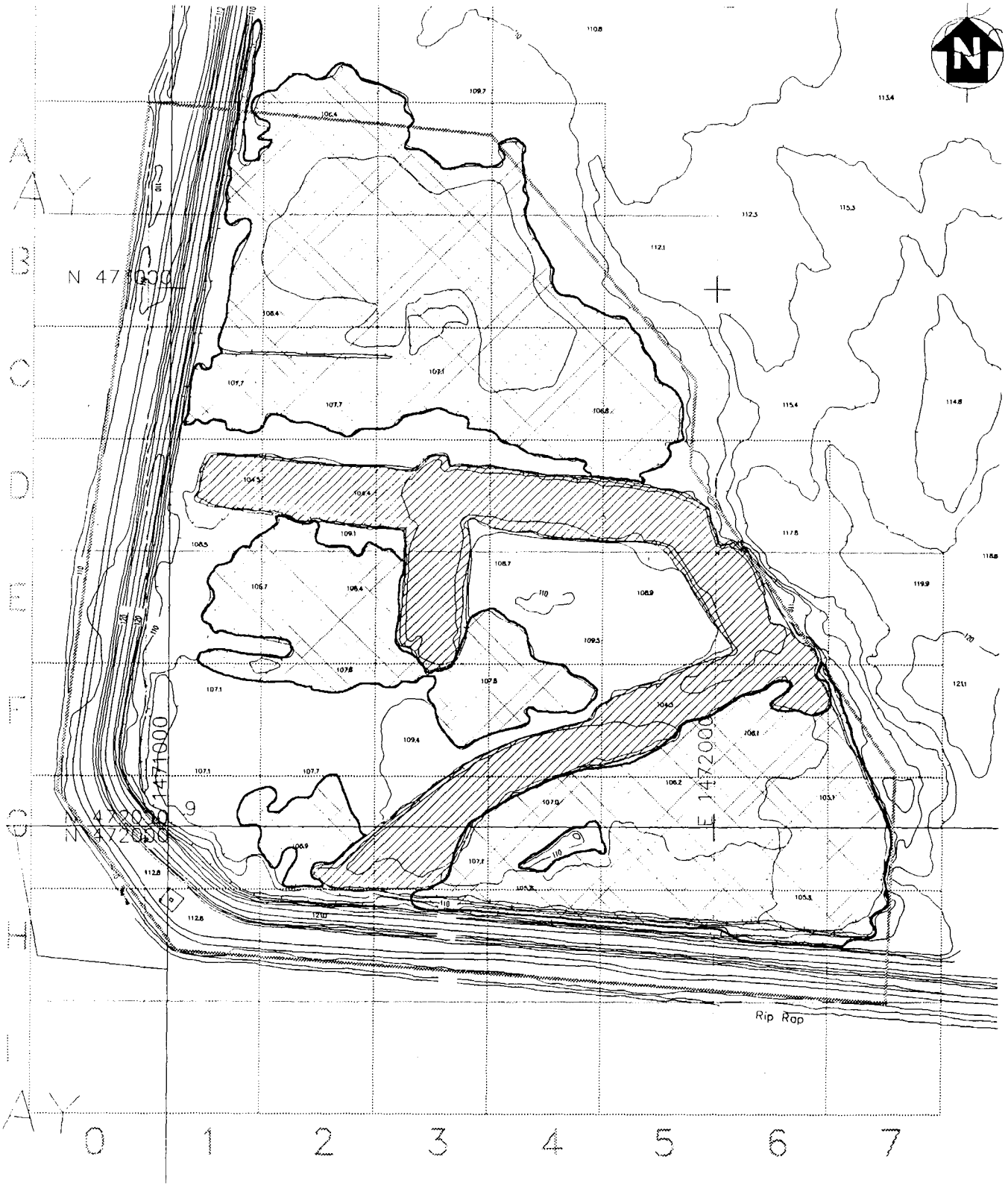
If a protected plant species is encountered, a detailed survey method, such as a quadrat survey, will be used. The survey method used will be appropriate for the specific protected plant species encountered and its associated vegetative community.

This survey is proposed for late May or early June 1995, which appears to be the flowering period common to all of the above plant species. Photographs of plants will be taken, and locations will be documented. Plant cuttings may be obtained for expert taxonomic identification if potential threatened and endangered plants cannot be identified in the field. Plant cutting methodology will be determined in consultation with regulatory agencies.

3.3 SALT MARSH HARVEST MOUSE SURVEY

A survey for the federally-threatened salt marsh harvest mouse will be performed on August 21 to August 31, 1995 to determine the absence or presence of this species at the West Beach Landfill wetland and the Runway Area wetland. Figures 2 and 3 show wetland areas that will be surveyed. The survey design includes using a total of 300 9-inch Sherman live traps in areas of dense pickleweed: 200 traps per night in the West Beach Landfill wetland and 100 traps per night in the Runway Area wetland (PRC 1995b). The duration of the salt marsh harvest mouse survey is expected to cover 8 nights, with a 2-day break after the first 4 nights. The survey will occur between late summer and early fall. Traps will be baited with birdseed and minced walnuts at dusk and checked the following morning. Fiber bedding material will be placed in each trap to reduce stress to captured animals from hypothermia.

Appropriate field guides and taxonomic keys will be used during this survey, and photographs will be taken of all captured animals. According to Ingles (1965), salt marsh harvest mice are nocturnal and are most active on moonlit nights. PRC suggests that the timing of this survey coincide with this lunar phase to help maximize trapping success.



NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

FIGURE 2

SALT MARSH HARVEST MOUSE SURVEY AREA WEST BEACH LANDFILL WETLAND

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

FIGURE 3
SALT MARSH HARVEST MOUSE SURVEY AREA RUNWAY AREA WETLAND

This survey will be performed in accordance with applicable threatened and endangered species act regulations and permitting requirements. PRC is currently investigating two survey options with the Navy: working under the Navy's existing permit or using a permitted subcontractor. PRC will develop a health and safety plan that addresses risks associated with hantavirus exposure, animal handling, and appropriate measures for hantavirus risk reduction.

3.4 THREATENED AND ENDANGERED SPECIES SURVEY REPORT

A report will be prepared summarizing the results of the literature search, the vegetation survey, and the salt marsh harvest mouse survey. The report will include tables listing threatened and endangered species expected or observed at NAS Alameda. PRC will estimate the relative occurrence of threatened and endangered species and the potential for exposure to site-related contaminants. The report will include natural history data for the threatened and endangered species to facilitate the ecological risk assessment process and the formulation of assessment and measurement endpoints. A table with natural history data is presented in Appendix C. A comprehensive list of protected species will be prepared following the literature review and field surveys and will be presented in the threatened and endangered species report. The table will follow the format shown in Appendix C. A map will be prepared to indicate where threatened and endangered species are expected or were observed.

4.0 REFERENCES

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APPENDIX A

TABLES OF REPRESENTATIVE ECOLOGICAL RECEPTORS AT NAS ALAMEDA

VASCULAR PLANTS AT NAS ALAMEDA

Species	Common Name	NAS Alameda Site
AIZOACEAE		
Carpobrotus chilense	Iceplant	R, WBL
Carpobrotus edule	Hottentot Fig	R, WBL
ASTERACEAE		
Baccharis pilularis var. *consanguinea*	Coyote Brush	WBL
Carduus sp.	Italian Thistle	WBL
Cirsium vulgare	Bull Thistle	WBL
Cotula coronopifolia	Brass Buttons	R
Grindelia sp.	Gum Plant	R
Jaumea carnosa	Jaumea	R, WBL
BORAGINACEAE		
Plagiobothrys sp.	Popcorn Flower	WBL
BRASSICACEAE		
Raphanus sativus	Wild Radish	R, WBL
CARYOPHYLLACEAE		
Spergularia marina	Saltmarsh Sandspurry	R, WBL
CHENOPODIACEAE		
Atriplex semibaccata	Australian Saltbush	WBL
Salicornia virginica	Pickleweed	R, WBL
CYPERACEAE		
Carex sp.	Sedge	WBL
FABACEAE		
Lotus formosissimus	Seaside Trefoil	R, WBL
Vicia sp.	Vetch	R, WBL
GERANIACEAE		
Geranium dissectum	Cut-leaved Geranium	R, WBL
PLANTAGINACEAE		
Plantago coronopus	Cut-leaved Plantain	R, WBL
POACEAE		
Bromus diandrus	Ripgut Brome	R, WBL
Distichlis spicata	Saltgrass	R, WBL

VASCULAR PLANTS AT NAS ALAMEDA

Species	Common Name	NAS Alameda Site
Hordeum leporinum	Foxtail Grass	R, WBL
Vulpia myuros	Rattail Fescue	R, WBL
POLYGONACEAE		
Rumex crispus	Curly Dock	R, WBL

Table Explanation

R Runway Wetland
WBL West Beach Landfill

References for Occurrence

The Habitat Restoration Group 1993. Naval Air Station Alameda Preliminary Wetland Delineation.

TERRESTRIAL INVERTEBRATES AT NAS ALAMEDA

Class	Order	Family	Common Name
Gastropoda			
	--	Assiminidae	Pulmonate snails
Oligochaeta			
	--	--	Earthworms
Diplopoda			
	Spirobolida	--	Millipedes
Chilopoda			
	Lithobiomorpha	--	Centipedes
	Geophilomorpha	--	
Symphyla			
	--	--	Myriapods
Insecta			
	Protura	--	Proturans
	Diplura	--	Diplurans
	Thysanura	Machilidae	Rockhoppers
	Collembola	Onychiuridae	Louse
		Isotomidae	Springtails
	Orthoptera	Acrididae	Grasshoppers
		Gryllacrididae	Crickets
	Dermaptera	Forficulidae	Earwigs
	Embioptera	Embiidina	Webspinners
	Psocoptera	--	Bark Lice
	Thysanoptera	Phlaeothripidae	Black Hunter
		Thripidae	Thrips
	Hemiptera	Nabidae	Damsel Bugs
		Lygaeidae	Milkweed Bugs, Cinch Bugs

TERRESTRIAL INVERTEBRATES
AT NAS ALAMEDA

Class	Order	Family	Common Name
Insecta (Cont.)			
	Hemiptera	Rhopalidae	Western Box Elder Bug
		Miridae	Plant Bugs
		Pentatomidae	Stink Bugs
		Cicadellidae	Leafhoppers
		Fulgoridae	Planthoppers
		Aphididae	Aphids
		Coccidae	Scale Bugs, Mealy Bugs
	Neuroptera		Nerve-Winged Insects
	Coleoptera	Carabidae	Predaceous Ground Beetles
		Staphylinidae	Rove Beetles
		Dermestidae	Hide Beetles
		Cleridae	Checkered Beetles
		Elateridae	Click Beetles
		Coccinellidae	Ladybird Beetles
		Tenebrionidae	Darkling Ground Beetles
		Chrysomelidae	Leaf Beetles
		Curculionidae	Weevils
	Lepidoptera	Noctuidae	Millers and Cutworms
	Diptera	Tipulidae	Crane Flies
		Culicidae	Mosquitoes
		Ceratopogonidae	Sand Flies
		Mycetophilidae	Fungus Gnats
		Scatopsidae	Dung Flies
		Cecidomyiidae	Gall Midges
		Psychodidae	Moth Flies
		Anthomyiidae	Anthomyiid Flies
		Muscidae	Muscid Flies
		Dolichopodidae	Long-legged Flies
		Syrphidae	Hover Flies
		Drosophilidae	Pomace or Vinegar Flies
		Stratiomyidae	Soldier Flies
	Hymenoptera	Chalcidae	Wasps
		Formicidae	Ants

TERRESTRIAL INVERTEBRATES AT NAS ALAMEDA

Class	Order	Family	Common Name
Arachnida	Aranae	--	Spiders
	Acarina	--	Mites and Ticks
	Pseudoscorpionida	--	Small Spiders

Table Explanation

This list was compiled using Harvey's (1991) list of invertebrates reported to occur at WPNSTA Concord. Based on habitat preference and geographical distribution, there is a potential for occurrence of these invertebrates at NAS Alameda. Actual occurrence is unknown.

This list is not all inclusive, but is only a representation of some of the invertebrates which may be present at NAS Alameda.

-- = Information regarding Order or Family names was not found during this preliminary search.

References for Occurrence

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AMPHIBIANS AND REPTILES
AT NAS ALAMEDA

Species (and reference)	Status	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY AMBYSTOMATIDAE				
Tiger Salamander (3) *Ambystoma tigrinum*	None	Air, Soil, Sed, SW/ Reproduce in ponds; burrows	G, W	Carnivore (Adults: earthworms, snails, insects, fish, small mammals; Young: zooplankton, arthropods, amphipods, mollusks, insect larvae)
FAMILY PLETHODONTIDAE				
Ensatina (2,3) *Ensatina eschscholtzi*	None	Air, Soil, Sed, SW/ Use rodent burrows, seeks cover under objects	G, W	Carnivore (spiders, collembolans, coleopterans, camel crickets, termites, ants, millipedes, centipedes, sowbugs)
California Slender Salamander (3) *Batrachoseps attenuatus*	None	Air, Soil, Sed, SW/ Use rodent, termite & earthworm tunnels, seeks cover under plant debris	G, W	Carnivore (spiders, mites, insects, earthworms, snails)
FAMILY PELOBATIDAE				
Western Spadefoot (3) *Scaphiopus hammondi*	None	Air, Soil, Sed, SW/ Burrows	G	Carnivore (Adults: insects, worms, invertebrates (butterfly, moth larvae, ants, termites, beetles; Tadpoles: plankton, algae, dead aquatic larvae)

AMPHIBIANS AND REPTILES
AT NAS ALAMEDA

Species (and reference)	Status	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY BUFONIDAE				
Western Toad (3) *Bufo boreas*	None	Air, Soil, Sed, SW/ Use rodent burrows, hide under objects, bury themselves in loose soil	G, W	Carnivore (Adults: terrestrial insects, small arthropods, earthworms, snails, slugs; Tadpoles: plankton, detritus)
FAMILY HYLIDAE				
Pacific Treefrog (2,3,4) *Hyla regilla*	None	Air, Soil, Sed, SW/ Seek cover in moist niches in buildings, wells, rotting logs or burrows	G, W	Carnivore (Adults: slugs, spiders, isopods, centipedes, earthworms and insects)
FAMILY IGUANIDAE				
Western Fence Lizard (1,2,3,4) *Sceloporus occidentalis*	None	Air, Soil/ May enter burrows and crevices	G *	Carnivore (terrestrial insects, other terrestrial invertebrates)
Coast Horned Lizard (3) *Phrynosoma coronatum*	None	Air, Soil/ Burrow in loose soil	G	Carnivore (ants, beetles, wasps, grasshoppers, flies, caterpillars)
FAMILY SCINCIDAE				
Western Skink (3) *Eumeces skiltonianus*	None	Air, Soil, Sed, SW/ Burrow, prefer moist habitats	G, W	Carnivore (insect eggs and larvae, beetles, caterpillars, moths, grasshoppers, crickets, ants, spiders, centipedes, sow bugs)

AMPHIBIANS AND REPTILES
AT NAS ALAMEDA

Species (and reference)	Status	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY TEIIDAE				
Western Whiptail (3) *Cnemidophorus tigris*	None	Air, Soil/ Forage in cracks, crevices and loose soil	G	Carnivore (invertebrates, such as grasshoppers, beetles, ants, termites, insect larvae, spiders)
FAMILY ANGUIDAE				
Northern Alligator Lizard (2,3,4) *Gerrhonotus coeruleus*	None	Air, Soil/ Refuge taken in crevices, rock fissures, mammal burrows, and under surface objects	G	Carnivore (insects, spiders, millipedes, snails)
Racer (3) *Coluber constrictor*	None	Air, Soil/ Seek cover	G, W	Carnivore (small mammals, birds, snakes, lizards, frogs, insects)
Coachwhip (3) *Masticophis flagellum*	None	Air, Soil, SW/ Seek cover in rodent burrows, bushes, trees, rock piles	G	Carnivore (rodents, lizards, eggs, snakes, birds and eggs, young turtles, insects, carrion)
Gopher Snake (2,3,4) *Pituophis melanoleucus*	None	Air, Soil/ Seek cover in rodent burrows and under objects	G, W	Carnivore (Adults: mammals, mice, kangaroo rats, gophers, ground squirrels, rabbits, and birds, quail, ducks and eggs; Juveniles: young mice, small lizards)
Common Kingsnake (3) *Lampropeltis getulus*	None	Air, Soil/ Seek cover in rodent burrows and under objects	G, W	Carnivore (lizards, snakes, small rodents, birds and eggs)

AMPHIBIANS AND REPTILES
AT NAS ALAMEDA

Species (and reference)	Status	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Garter Snake (3,4) *Thamnophis sirtalis*	None	Air, Soil, Sed, SW/ Retreat to holes at night	G, W	Carnivore (treefrogs, fish, mice, leeches, earthworms, toads, also small mammals, birds, lizards, amphibians, slugs)
Western Terrestrial Garter Snake (2,3,4) *Thamnophis elegans*	None	Air, Soil, Sed/ Prefers holes, burrows and hiding under surface objects	G, W	Carnivore (small mammals, birds, fishes, frogs, salamanders, insects, crabs, marine polychaete worms, leeches, earthworms, snails, slugs, refuse)
Western Aquatic Garter Snake (3) *Thamnophis couchi*	CT CP	Air, Soil, Sed, SW/ Forage along streams, retreat to holes at night	W	Carnivore (aquatic, fishes (trouts and sculpins), amphibians and amphibian young, small mammals, leeches, earthworms)
FAMILY VIPERIDAE				
Western Rattlesnake (3) *Crotalus viridis*	None	Air, Soil/ Seek cover in crevices, vegetation, mammal burrows, and under surface objects	G, W	Carnivore (Adults: rodents, ground squirrels, rabbits, birds, carrion; Juveniles: lizards, western fence and side-blotched lizards, young rodents)

AMPHIBIANS AND REPTILES AT NAS ALAMEDA

Table Explanation

All species listed in the table are expected to be year-round residents of NAS Alameda and to reproduce at NAS Alameda

All of the species listed above are native to California.

References for Occurrence

(1) Feeney, L.R., and L.D. Collins. 1993. This document provides lists of mammal, bird, reptile, and fish species that have been observed at NAS Alameda based on the following sources:

Bailey, S.F., and Collins, L.D. 1983. "Annotated list of waterbirds of the Naval Air Station, Alameda." March.

Bailey, S.F. 1985. "A study of bird use of the breakwater island and breakwater gap area of the Naval Air Station, Alameda."
Christmas Bird Counts conducted by volunteers of Golden Gate Audubon Society, 1984, 1985, 1987, 1988, 1990, 1992.
Observations made during foraging and nesting surveys of California least terns at NAS Alameda, various observers, for last several years.

(2) U.S. Navy. 1990. "Final Environmental Impact Statement Candidate Base Closures / Realignment San Francisco Bay Area, Volume 1, Final EIS". Engineering Field Activity-West. November.

(3) California Department of Fish and Game (CFG). 1988. "California's Wildlife, Volume I, Amphibians and Reptiles." May.

(4) PRC. 1994. "NAS Alameda Ecological Assessment (Draft)." February.

Status

Species of special conservation status, as registered in the California Department of Fish and Game's Natural Diversity Data Base, are indicated by the following codes.

SSC	California Department of Fish and Game (CDFG) Species of Special Concern
CE	State of California Endangered Species
CCE	State of California Candidate for Endangered Species
CT	State of Claifornia Threatened Species
CFP	State of Claifornia Fully Protected Species
FE	Federal Endangered Species
HS	Species designated for harvest under California State Fish and Game Code and USFWS regulations.
AB	Species listed on the Audubon Blue List of birds designated by the National Audubon Society as experiencing a population decline.
None	Species has no special status

Primary Exposure

The primary exposure description reflects the primary routes of exposure to contaminants for the species, excluding exposure through ingestion of contaminated prey.

Air	Air
Soil	Soil
Sed	Sediments
SW	Surface Water (including San Francisco Bay water)

Habitat/Presence

O	San Francisco Bay, open waters
W	Wetland areas
G	Grassy areas sometimes with shrubs and small trees
H	Hard surfaces such as tarmac, gravel, pavement
IBW	Island breakwater
BW	Connected breakwater
B	Beach
RR	Rip-rap, most shore edges excluding small beaches

T Trees near shooting range
P Pier
* *Observed at NAS Alameda (Species not marked with an "*" are expected to occur at NAS Alameda).*

Feeding Guild

Carnivore	Eats primarily animals.
Herbivore	Eats primarily plants.
Insectivore	Eats primarily insects.
Omnivore	Eats a combination of animals and plants.

References

California Department of Fish and Game (CFG). 1988. "California's Wildlife, Volume I, Amphibians and Reptiles." May.

U.S. Navy. 1990. "Final Environmental Impact Statement Candidate Base Closures /Realignment San Francisco Bay Area, Volume 1, Final EIS". Engineering Field Activity-West. November.

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FWS. 1994. "Special Animals." August.

FWS. 1994. "Endangered and Threatened Animals of California." October.

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY GAVIIDAE						
Red-throated Loon (1) *Gavia stellata*	None	Yes	Winter	Sed, SW/ Dives	O *	Carnivore/Omnivore (fish, crustaceans, leeches, snails, aquatic insects, other invertebrates)
Common Loon (1,3) *Gavia immer*	SSC	Yes	Winter	Sed, SW/ Dives	O *	Carnivore/Omnivore (fish, crustaceans, aquatic plants, algae, snails, leeches, frogs, salamanders, aquatic insects)
FAMILY PODICIPEDIDAE						
Pied-billed Grebe (1,3,4) *Podilymbus podiceps*	None	Yes	Winter	Sed, SW/ Dives	O *	Carnivore/Omnivore (insects, crustaceans, fish, amphibians, mollusks, leeches, aquatic plants; Young: insects)
Horned Grebe (1,4) *Podiceps auritus*	None	Yes	Winter	Sed, SW/ Dives	O *	Carnivore (small fish, crustaceans, insects)
Eared Grebe (1,3,4) *Podiceps nigricollis*	None	Yes	Winter	Sed, SW/ Dives	O *	Carnivore (aquatic and land insects and larvae, crustaceans, mollusks, inverts, small fish, amphibians)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Western Grebe (1,3,4) *Aechmophorus occidentalis*	None	Yes	Winter	Sed, SW/ Dives; nests at edge of or in open water.	O *	Carnivore/Omnivore (fish, insects, other invertebrates, rarely amphibians and plants)
Clark's Grebe (1,3,4) *Aechmophorus clarkii*	None	Yes	Winter	Sed, SW/ Dives	O *	Carnivore (fish, insects, other invertebrates)
FAMILY PROCELLARIIDAE						
Sooty Shearwater (1) *Puffinus griseus*	None	Yes	Transient	SW	O *	Carnivore (fish, shrimp)
FAMILY HYDROBATIDAE						
Fork-tailed Storm Petrel (1) *Oceanodroma furcata*	SSC (rookery)	Yes	Transient	SW	O *	Carnivore (fish, crustaceans, carrion)
FAMILY PELICANIDAE						
American White Pelican (1) *Pelecanus erythrorhynchos*	SSC	Yes	Transient	Soil, Sed, SW	W, O *	Carnivore (fish, occasionally amphibians and crustaceans)
California Brown Pelican (1,3) *Pelecanus occidentalis californicus*	FE (nest colony) CE (nest colony) CFP	Yes	Summer Transient	Soil, Sed, SW	IBW, O *	Carnivore (fish, occasionally crustaceans, carrion)
FAMILY PHALACROCORACIDAE						
Double-crested Cormorant (1,3,4) *Phalacrocorax auritis*	SSC	Yes	All year	Sed, SW Dives; roosts on shore	O, IBW *	Carnivore (fish, also crustaceans and amphibians)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Brandt's Cormorant (1) *Phalacrocorax penicillatus*	None	Yes	All year	Sed, SW Dives; roosts on shore	O, IBW *	Carnivore (fish, crustaceans)
Pelagic Cormorant (1) *Phalacrocorax pelagicus*	None	Yes	All year	SW Dives; roosts on rocky cliffs	O, IBW *	Carnivore (fish, crustaceans)
FAMILY ARDEIDAE						
Great Blue Heron (1,4) *Ardea herodias*	None	Yes	All year	Soil, Sed, SW	W, G *	Carnivore (fish, also small rodents, amphibians, snakes, lizards, insects, crustaceans, occasionally small birds)
Great Egret (1,3,4) *Casmerodius albus*	None	Yes	All year	Soil, Sed, SW	W, G *	Carnivore (fish, amphibs, snakes, snails, crustaceans, insects, small mammals)
Snowy Egret (1,3,4) *Egretta thula*	None	Yes	All year	Soil, Sed, SW	W, B, IBW, RR *	Carnivore (small fish, crustaceans, large insects, also amphibians, reptiles, worms, snails, small mammals)
Black-crowned Night-Heron (1,3,4) *Nycticorax nycticorax*	None	Yes	All year	Soil, Sed, SW	W, BW, RR, IBW *	Carnivore (fishes, crustaceans, aquatic invertebrates, amphibians, reptiles, small mammals)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY ANATIDAE						
Snow Goose (1) *Chen caerulescens*	None	Yes	Winter	Soil, Sed, SW/ Feeds from bottom sediment	W *	Herbivore (seeds, stems, roots, berries)
Canada Goose (1,4) *Branta canadensis*	FT (Aleutian subspecies)	Yes	Winter	Soil, Sed, SW	W, G, H *	Herbivore (green shoots and seeds of grains and wild grasses and forbs, aquatic plants)
Green-winged Teal (1,4) *Anas crecca*	HS	Yes	Winter	Soil, Sed, SW	W *	Omnivore (seeds, leaves, and stems of aquatic plants, terrestrial grasses, forbs, grains)
Blue-winged Teal (4) *Anas discors*	HS	Yes	Winter	Soil, Sed, SW	W, O	Omnivore (seeds, vegetative parts of plants, mollusks, insects, crustaceans)
Mallard (1,4) *Anas platyrhynchos*	HS	Yes	All year	Soil, Sed, SW	W, O *	Herbivore/Omnivore (grains, seeds, leaves of aquatic plants, grasses, other green vegetation, aquatic insects, also snails, earthworms, tadpoles, crustaceans, small fish)
Northern Pintail (1,4) *Anas acuta*	HS	Yes	All year	Soil, Sed, SW	W *	Omnivore (aquatic plant seeds, wild grasses, forbs, grains, insects, crustaceans, mollusks, worms, stems, leaves)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Cinnamon Teal (1,4) *Anas cyanoptera*	HS	Yes	All year	Soil, Sed, SW	W *	Omnivore (plant matter, seeds and vegetative parts of sedges, pondweeds, grasses, mollusks, insects)
Northern Shoveler (1,4) *Anas clypeata*	None	Yes	All year	Soil, SW	W *	Omnivore (phyto- and zooplankton, including algae, crustaceans, and insect larvae, also seeds and other parts of aquatic plants, mollusks, aquatic insects, small fish)
Gadwall (1,4) *Anas strepera*	HS	Yes	Winter	Sed, SW	W	Herbivore/Omnivore (leaves and stems of aquatic plants, seeds and cultivated grains, also insects, mollusks, crustaceans)
Eurasion Wigeon (1,4) *Anas penelope*	None	Yes	Winter	Sed, SW	W *	Herbivore/Omnivore (stems and leafy parts of plants, upland grassess and clovers, insects ingests gravel)
American Wigeon (1,3,4) *Anas americana*	HS	Yes	Winter	Soil, Sed, SW	W, O *	Omnivore (leaves, stems of aquatic plants and terrestrial grasses and forbs, also crops-lettuce, alfalfa, clover, some seeds, waste grain; Young: insects, inverts)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Canvasback (1,4) *Aythya valisneria*	HS	Yes	Winter	Sed, SW	O, W *	Omnivore (seeds, tubers, leaves, stems of aquatic plants, aquatic mollusks, crustaceans, worms, insects, fish, invertebrates)
Greater Scaup (1,4) *Aythya marila*	HS	Yes	Winter	Sed, SW	O *	Omnivore (mollusks, crustaceans, insects)
Lesser Scaup (1,4) *Aythya affinis*	None	Yes	Winter	Sed, SW Dives	O *	Omnivore (aquatic invertebrates, mollusks, insects, crustaceans, leaves, stems, seeds aquatic plants)
Oldsquaw (1) *Clangula hyemalis*	None	Yes	Winter	Sed, SW Dives	O *	Omnivore (small crustaceans, mollusks, aquatic insects, small fishes, plant matter)
Black Scoter (1) *Melanitta nigra*	None	Yes	Winter	Sed, SW Dives	O *	Omnivore (marine invetebrates, bivalves, gastropods, barnacles, shrimp, herring roe, aquatic plant material)
Surf Scoter (1,3) *Melanitta perspicillata*	None	Yes	Winter	Sed, SW Dives	O *	Omnivore (bivalves, gastropods, crustaceans, other invertebrates, fish, plant material)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
White-winged Scoter (1) *Melanitta fusca*	None	Yes	Winter	Sed, SW Dives	O *	Omnivore (bivalves and gastropods, crustaceans, other invertebrates, fish, plant material)
Common Goldeneye (1,4) *Bucephala clangula*	None	Yes	Winter	Soil, Sed, SW	O *	Omnivore (crustaceans, mollusks, small fish, insects, seeds, tubers, leaves, stems of aquatic plants)
Bufflehead (1,4) *Bucephala albeola*	HS	Yes	Winter	Soil, Sed, SW	O, W *	Omnivore (small inverts, crustaceans, mollusks aquatic insects, gastropods, fish, seeds, parts of aquatic plants. Young: aquatic insects)
Red-breasted Merganser (1,4) *Mergus serrator*	None	Yes	Winter	Soil, SW Dives	O *	Omnivore (fish, crustaceans, amphibians, insects worms)
Ruddy Duck (1,4) *Oxyura jamaicensis*	None	Yes	All year	Sed, SW Dives	O *	Omnivore (seeds, tubers, foliage, stems of submerged aquatic plants, aquatic insects, mollusks, crustaceans, worms)
FAMILY RALLIDAE						
American Coot (1,4) *Fulica americana*	HS	Yes	All year	Soil, Sed, SW	W, O *	Omnivore (submerged aquatic plants, seeds, insects, small fish)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY HAEMATOPODIDAE						
Black Oystercatcher (1,4) *Haematopus bachmani*	None	Yes	All year	Sed, SW	IBW, BW, RR	Carnivore (crustaceans, marine worms, fish)
FAMILY RECURVIROSTRIDAE						
Black-necked Stilt (1,4) *Himantopus mexicanus*	None	Yes	All year	Sed, SW	W *	Carnivore (insects, crustaceans, mollusks, other aquatic inverts, small fish)
American Avocet (1,4) *Recurvirostra americana*	None	Yes	All year	Soil, Sed, SW (soil only when nesing)	W *	Omnivore (aquatic insects, crustaceans, snails, worms, aquatic plant seeds)
FAMILY CHARADRIIDAE						
Black Bellied Plover (1,4) *Pluvialis squatarola*	None	Yes	All year	Soil, Sed, SW/ Probes substrate	W, B *	Carnivore (polychaete worms, small mollusks and crustaceans, mud snails, insects)
Western Snowy Plover (1,2) *Charadrius alexandrinus nivosus*	SSC FT (coastal)	Yes	All year	Soil, Sed	H *	Carnivore (insects, amphipods, young sand crabs, brine flies at salt ponds and alkali lakes)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Semipalmated Plover (1,4) *Charadrius semipalmatus*	None	Yes	spring, fall, Winter	Soil, Sed, SW Probes substrate	W, B *	Carnivore (annelid worms, small mollusks, amphipods, fly larvae, locusts, other aquatic and terrestrial insects)
Killdeer (1,4) *Charadrius vociferus*	None	Yes	All year	Soil, Sed, SW	G, W, H, B *	Carnivore/Omnivore (invertebrates, insects, beetles, grasshoppers, flies, mosquitoes, weevils, crustaceans, worms, mollusks, seeds)
FAMILY SCOLOPACIDAE						
Willet (1,3,4) *Catoptrophorus semipalmatus*	None	Yes	Winter	Sed, SW/ Probes	RR, B, BW, W *	Carnivore (invertebrates, small crustaceans, mollusks, polychaete worms, larval and pupal dipteran insects, fish, fish eggs)
Whimbrel (4) *Numenius phaeopus*	None	Yes	spring & fall	Sed, SW/ Probes	RR, B, BW, W	Omnivore (crabs, crayfish, marine worms, grasshoppers, beetles, spiders, and berries)
Wandering Tattler (1) *Heteroscelus incanus*	None	Yes	Winter	Sed, SW	BW, IBW *	Carnivore (decapod crustaceans, marine worms, small mollusks)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Spotted Sandpiper (1,4) *Actitis macularia*	None	Yes	Winter	Soil, Sed, SW	BW, RR, BM *	Carnivore (flying and benthic insects, beetles, crickets, flies, grasshoppers, worms, ants, other aquatic inverts, small fish)
Long-billed Curlew (1,4) *Numenius americanus*	SSC	Yes	Winter	Sed, SW/ Probes	W *	Carnivore (mud crabs, ghost and mud shrimp, insect pupae, gem clams, small estuarine fish)
Marbled Godwit (1,4) *Limosa fedoa*	None	Yes	Winter	Sed, SW/ Probes	B, W *	Carnivore (small snails and clams, sand crabs, amphipods, polychaete worms)
Ruddy Turnstone (1) *Arenaria interpres*	None	Yes	Spring, Fall, Winter	Sed, SW/ Probes	IBW, BW, B *	Omnivore (crustaceans, worms, mollusks, insects, small fish, vegetative material)
Black Turnstone (1) *Arenaria melanocephala*	None	Yes	Spring, fall,Winter	Sed, SW/ Probes	IBW *	Carnivore (small crustaceans and mollusks)
Sanderling (1,3) *Calidris alba*	None	Yes	Summer, fall, Winter	Sed, SW/ Probes	RR, IBW *	Carnivore (small crustaceans, sand crabs, amphipods, small mollusks, marine worms, adult and larval flies)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Western Sandpiper (1,3,4) *Calidris mauri*	None	Yes	Summer, fall, Winter	Soil, Sed, SW	MW, B, IBW *	Carnivore (insects, mollusks, crustaceans, worms; Young: adult and larval flies and beetles)
Least Sandpiper (1,4) *Calidris minutilla*	None	Yes	Summer, fall, Winter	Soil, Sed, SW/ Probes	W, B, RR, IBW *	Omnivore (invertebrates, crustaceans, worms, adult larval insects, seeds, plant material)
Rock Sandpiper (1) *Califris ptilocnemis*	None	Yes	Transient	Sed, SW/ Probes	RR *	Omnivore (mollusks, crustaceans, flies, beetles, seeds, algae)
Dunlin (1,4) *Calidris alpina*	None	Yes	Winter	Sed, SW/ Probes	W, B, R, IBW *	Carnivore (mollusks, crustaceans, polychaete worms)
Short-billed Dowitcher (1,4) *Limnodromus griseus*	None	Yes	Winter	Sed, SW/ Probes	B, W *	Omnivore (small mollusks, crustaceans, marine worms, vegetative material, insects)
Long-billed Dowitcher (1,4) *Limnodromus scolopaceus*	None	Yes	Winter	Sed, SW	W *	Omnivore (freshwater midge and other fly larvae, small burrowing crustaceans)
Common Snipe (4) *Gallinago gallinago*	None	Yes	Winter	Sed, Soil, SW/ Probes	W *	Carnivore (insects, earthworms, crustaceans, mollusks, occasionally fish)

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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Wilson's Pharalope (4) *Phalaropus tricolor*	None	Yes	Transient Summer	Sed, SW	W	Carnivore (insects and small crustaceans)
Red-necked Phalarope (1,4) *Phalaropus lobatus*	None	Yes	Transient	SW	W, O *	Carnivore/Omnivore (crustaceans, aquatic insects, mollusks, zooplankton, seeds)
Red Phalarope (1) *Phalaropus fulicaria*	None	Yes	Transient	SW	O *	Carnivore/Omnivore (aquatic insects, marine, invertebrates, fish, seeds)
FAMILY LARIDAE						
Pomarine Jaeger (1) *Stercorarius pomarinus*	None	Yes	Transient	SW	O *	Carnivore (fish, offal, carrion)
Parasitic Jaeger (1) *Stercorarius parasiticus*	None	Yes	Transient	SW	O *	Carnivore (fish, offal)
Bonaparte's Gull (1,4) *Larus philadelphia*	None	Yes	Transient, Winter	Soil, Sed, SW Scavenger	O *	Carnivore (insects, fish, crustaceans, marine worms)
Heermann's Gull (1) *Larus heermanni*	None	Yes	Summer, Fall	Soil, Sed, SW Scavenger	O, R, IBW *	Carnivore (marine fishes, shrimps, mollusks, crustaceans.)
Mew Gull (1,4) *Larus canus*	None	Yes	Winter	Soil, Sed, SW Scavenger	O, W, B, H *	Carnivore (mollusks, crustaceans, echinoderms, worms, insect larvae)

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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Ring-billed Gull (1,3,4) *Larus delawarensis*	None	Yes	All year	Soil, Sed, SW/ Drinks freshwater Scavenger	B, W, RR, H, O *	Omnivore (fish, insects, earthworms, crustaceans, garbage, grain, rodents, amphibians, reptiles, carrion)
California Gull (1,3,4) *Larus californicus*	SSC	Yes	All year	Soil, Sed, SW Scavenger	B, W, IBW *	Carnivore (garbage, carrion, earthworms, adult and larval insects)
Herring Gull (1,4) *Larus argentatus*	None	Yes	Winter	Soil, Sed, SW Scavenger	W, O, B, H, RR, IBW *	Omnivore (small fishes, invertebrates, worms, insect larvae, rats, mice, moles, small rabbits)
Thayer's Gull (1,4) *Larus thayeri*	None	Yes	Winter	Air Soil, Sed, SW Scavenger	W, O, B, H, RR, IBW *	Carnivore (garbage, marine invertebrates, carrion fish offal, pelagic crabs)
Western Gull (1,3,4) *Larus occidentalis*	None	Yes	All year	Soil, Sed, SW Scavenger	Uses all habitats IBW, W, RR, BW *	Omnivore (fish, intertidal invertebrates, small birds and eggs)
Glaucous-winged Gull (1,4) *Larus glaucescens*	None	Yes	Winter	Soil, Sed, SW/ Drinks freshwater Scavenger	O, W, RR, B, W, IBW *	Omnivore (barnacles, mollusks, sea urchins, carrion, and fish)
Caspian Tern (1,4) *Sterna caspia*	None	Yes	Summer	Soil, Sed, SW/ Dives	O, W *	Piscivore (small fish up to 15cm)

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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Elegant Tern (1,4) *Sterna elegans*	SSC, FC2 (nest colony)	Yes	Summer	Soil, Sed, SW/ Dives	O *	Carnivore (fish)
Forster's Tern (1,3,4) *Sterna forsteri*	None	Yes	All year	Soil, Sed, SW/ Dives	O, W, B *	Carnivore (small fish, aquatic insects, crustaceans, small amphibians)
Least Tern (1,4) *Sterna antillarum browni*	CE (nest colony) FE (nest colony)	Yes	Summer	Soil, Sed, SW/ Dives	H, O, B, W *	Piscivore (small fish, anchovy, silversides, shiner surfperch)
FAMILY ALCIDAE						
Common Murre (1) *Uria aalge*	None	Yes	Transient	Sed, SW	O *	Carnivore (fish, sand lances, herring, rockfish anchovies, crustaceans, cephalopods.
FAMILY CATHARTIDAE						
Turkey Vulture (1,4) *Cathartes aura*	None	Yes	All year	Soil, SW	G, H, W *	Carnivore/Omnivore (carrion, rotting fruit, live birds, eggs, live mammals)

BIRDS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY ACCIPITRIDAE						
White-tailed Kite (1,4) *Elanus caeruleus*	None	Yes	All year	Soil, Sed, SW	G, W, H *	Carnivore (voles and other small, diurnal mammals, birds, insects, reptiles, amphibians)
Northern Harrier (1,4) *Circus cyaneus*	SSC, AB	Yes	All year	Soil	G, W, H, RR *	Carnivore (voles, small mammals, birds, frogs, small reptiles, crustaceans, insects)
Sharp-shinned Hawk (4) *Accipiter striatus*	None	Yes	All year	Soil	G, W, H, RR	Carnivore (small birds, small mammals, insects, reptiles, amphibians)
Cooper's Hawk (4) *Accipiter cooperii*	None	Yes	All year	Soil	G, W	Carnivore (small birds, small mammals, amphibians, reptiles)
Red-tailed Hawk (1,4) *Buteo jamaicensis*	None	Yes	All year	Soil	G, W, H, T *	Carnivore (small mammals up to hares, small birds, reptiles, amphibs)
Red-shouldered Hawk (1) *Buteo lineatus*	AB	Yes	All year	Soil, SW	T *	Carnivore (varied diet: small mammals, snakes, lizards, amphibs, small or young birds, large insects)

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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Rough-legged Hawk (1) *Buteo lagopus*	None	Yes	Winter	Soil, Sed, SW	G *	Carnivore (small mammals and birds, game birds, reptiles, insects, rarely fish)
FAMILY FALCONIDAE						
American Kestrel (1,4) *Falco sparverius*	None	Yes	All year	Soil	G, H *	Carnivore (small mammals, birds, insects, earthworms, reptiles, amphibians)
Merlin (1,4) *Falco columbarius*	SSC	Yes	Winter	Soil, Sed, SW	G, H *	Carnivore (small mammals, birds, shorebirds, insects)
American Peregrine Falcon (1,2,4) *Falco peregrinus anatum*	SE, FE	Yes	All year	Soil, Sed, SW	O, G, H *	Carnivore (small mammals, birds, fish, insects)
FAMILY COLOMBIDAE						
Rock Dove (1,4) *Columba livia*	HS	Yes	All year	Soil, SW/ Drinks water	G, H *	Herbivore (grains, seeds, grasses, forbs, human food scraps)
Mourning Dove (1,4) *Zenaida macroura*	HS	Yes	All year	Soil, SW/ Drinks water	G, H *	Herbivore (seeds of cereal grains, forbs, grasses, insects)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILIES TYTONIDAE and STRIGIDAE						
Barn Owl (1) *Tyto alba*	None	Yes	All year	Soil	G, H *	Carnivore (mice, rats, voles, gophers, squirrels, shrews, insects, crustaceans, reptiles, amphibians, small birds)
Burrowing Owl (1) *Athene cunicularia*	SSC	Yes	All year	Soil, SW/ Burrows	G, H *	Carnivore (insects, small mammals, reptiles, birds, carrion)
FAMILY TROCHILIDAE						
Anna's Hummingbird (1,4) *Clypte anna*	None	Yes	All year	SW/ Bathes	T *	Omnivore (nectar, small insects, spiders, pollen, plant sap)
FAMILY ALCEDINIDAE						
Belted Kingfisher (1,3,4) *Ceryle alcyon*	None	Yes	All year	Soil, Sed, SW/ Burrows	W *	Carnivore (fish, also amphibians, crayfish, insects)
FAMILY TYRANNIDAE						
Black Phoebe (1,4) *Sayornis nigricans*	None	Yes	All year	Soil, Sed, SW/ Drinks; bathes	W *	Insectivore
Say's Phoebe (1,4) *Sayornis saya*	None	Yes	Winter	Soil	G *	Insectivore
Western Kingbird (4) *Tyrannus verticalis*	None	Yes	Summer	Soil	G	Insectivore/Omnivore (insects, rarely berries and seeds)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY ALAUDIDAE						
California Horned Lark (1,4) *Eremophila alpestris actia*	SSC, FC2	Yes	All year	Soil, Sed, SW/ Drinks; Nests in depression on ground in open.	G, H *	Omnivore (insects, snails, spiders, grass and forb seeds, other plant matter)
FAMILY HIRUNDINIDAE						
Tree Swallow (4) *Tachycineta bicolor*	None	Yes	All year	Soil	G, W *	Insectivore/Omnivore (insects, rarely berries and seeds)
Violet-green Swallow (4) *Trachycineta thalassina*	None	Yes	All year	Soil	G, W	Insectivore
Northern Rough-winged Swallow (4) *Stelgidopteryx serripennis*	None	Yes	All year	Soil	G, W *	Insectivore
Barn Swallow (1,4) *Hirundo rustica*	None	Yes	Summer	Soil, Sed, SW/ Drinks, bathes	G, H, W, P *	Insectivore/Omnivore (insects, rarely berries and seeds)
FAMILY CORVIDAE						
Common Raven (1) *Corvus corax*	None	Yes	All year	Soil	G, H *	Omnivore (carrion, small vertebrates, mice, rabbits, bird eggs and young, insects, seeds, grains, nuts, berries, other fruit)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY MUSCICAPIDAE						
American Robin (1) *Turdus migratorius*	None	Yes	All year	Soil, Sed, SW/ Drinks; Bathes	G *	Omnivore (earthworms, catepillars, beetles, other small arthropods, snails, berries and other fruits, seeds, sprouts)
FAMILY LANIDAE						
Loggerhead Shrike (1,4) *Lanius ludovicianus*	SSC, FC2	Yes	All year	SW	G, T *	Carnivore (large insects, also small birds, mammals, reptiles, fish, carrion, other invertebrates)
FAMILY MIMIDAE						
Northern Mockingbird (1) *Mimus polyglottus*	None	Yes	All year	Soil, SW	T *	Omnivore (insects, earthworms, snails, berries, small fruits)
FAMILY MOTACILLIDAE						
American Pipit (1,4) *Anthus rubescens*	None	Yes	Winter	Soil, Sed, SW	G, H *	Omnivore (insects, also mollusks, crustaceans, arthropods, seeds)

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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY STURNIDAE						
European Starling (1,4) *Sturnus vulgaris*	None	No	All year	SW/ Drinks	G *	Omnivore (insects, other invertebrates, grains, seeds, nuts, fruits, garbage)
FAMILY EMBERIZIDAE						
Orange-crowned Warbler (4) *Vermivora celata*	None	Yes	Summer	SW/ Drinks	G	Omnivore (mostly insects; also seeds small fruits, plant galls, nectar, tree sap)
Yellow Warbler (4) *Dendroica petechia*	None	Yes	Summer	SW/ Drinks	G	Omnivore (insects, spiders, berries)
Wilson's Warbler (4) *Wilsonia pusilla*	None	Yes	Summer	SW/ Drinks	G	Omnivore (mostly insects; also seeds, berries and other small fruits)
Yellow-rumped Warbler (1,4) *Dendroica coronata*	None	Yes	Winter	SW/ Bathes	T *	Omnivore (insects, spiders, also small fruits, seeds)
Lincoln's Sparrow (4) *Melospiza lincolnii*	None	Yes	Winter	SW/ Drinks	G	Omnivore (insects, millipedes, other small invertebrates, seeds)
Savannah Sparrow (1,4) *Passerculus sandwichensis*	None	Yes	All year	Soil, SW	W, G *	Omnivore (grass, seeds, insects, snails, spiders)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
Alameda Song Sparrow (1,2,4) *Melospiza melodia pusillula*	SSC, FC2	Yes	All year	Soil, SW	W *	Omnivore (seeds, insects, spiders, other small invertebrates, mollusks, crustaceans along coast)
White-crowned Sparrow (1,4) *Zonotrichia leucophrys*	None	Yes	All year	SW	G *	Omnivore (seeds of grasses and forbs, green shoots, insects, spiders, flowers, berries)
Golden-crowned Sparrow (4) *Zonotricha atricapilla*	None	Yes	Winter	Soil, SW	G *	Herbivore (seeds of grasses and forbs, buds, seedlings, flowers)
Red-winged Blackbird (1,4) *Agelaius pheoniceus*	None	Yes	All year	SW; bathes	W *	Omnivore (seeds, grains, insects, spiders)
Salt Marsh Common Yellowthroat (2,4) *Geothlypis trichas sinuosa*	SSC	Yes	All year	SW	W *	Omnivore (insects, caterpillars and other larvae, spiders, seeds)
Western Meadowlark (1,4) *Sturnella neglecta*	None	Yes	All year	Soil, SW/ Probes; bathes	G, H *	Omnivore (insects, spiders, sowbugs, snails, grass and forb seeds and grains, carrion, bird eggs)
Brewer's Blackbird (1,4) *Euphagus cyanocephalus*	None	Yes	All year	Soil, SW	G, H *	Omnivore (insects, also spiders, crustaceans, snails, seeds and grains)

BIRDS
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Species (and reference)	Status	CA Native	SF Bay Residency	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY FRINGILLIDAE						
House Finch (1,4) *Carpodacus mexicanus*	None	Yes	All year	SW	G *	Omnivore (seeds of grasses and forbs, buds, berries, small fruits, also insects)
Lesser Goldfinch (4) *Carduelis psaltria*	None	Yes	All year	SW	G	Omnivore (seeds, buds, fruits, leaves, insects)
American Goldfinch (1) *Carduelis tristis*	None	Yes	All year	Soil, SW bathes	W, G *	Omnivore (seeds, insects, aphids and caterpillars, tree buds)

BIRDS
AT NAS ALAMEDA

Table Explanation

References for Occurrence

(1) Feeney, L.R., and L.D. Collins. 1993. This document provides lists of mammal, bird, reptile, and fish species that have been observed at NAS Alameda based on the following sources:

Bailey, S.F., and Collins, L.D. 1983. "Annotated list of waterbirds of the Naval Air Station, Alameda." March.

Bailey, S.F. 1985. "A study of bird use of the breakwater island and breakwater gap area of the Naval Air Station, Alameda."

Christmas Bird Counts conducted by volunteers of Golden Gate Audubon Socieity, 1984, 1985, 1987, 1988, 1990, 1992.

Observations made during foraging and nesting surveys of California least terns at NAS Alameda, various observers, for last several years.

(2) FWS 1993. "Listed and Proposed Endangered and Threatened Species and Candidate Species that may occur in the Area of the Proposed Closure of Naval Air Station, Alameda, Alameda County, California (1-1-94-SP-192, December 31, 1993)". Enclosure attached to letter from Dale A. Pierce, USFW, to John H. Kennedy, Department of the Navy.

(3) Environmental Science Associates, Inc. 1987. The environmental impact statement for the homeporting of Navy ships at NAS Alameda includes a waterbird survey conducted at NAS Alameda.

(4) PRC 1994. "NAS Alameda Ecological Assessment (Draft). February.

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Status

Species of special conservation status, as registered in the California Department of Fish and Game's Natural Diversity Data Base, are indicated by the following codes.

SSC	California Department of Fish and Game (CFG) Species of Special Concern
CE	State of California Endangered Species
CCE	State of California Candidate for Endangered Species
CT	State of Claifornia Threatened Species
CFP	State of Claifornia Fully Protected Species
FE	Federal Endangered Species
FT	Federal Threatened Species
FC2	Federal Category 2 Species
HS	Species designated for harvest under California State Fish and Game Code and FWS regulations.
AB	Species listed on the Audubon Blue List of birds designated by the National Audubon Society as experiencing a population decline.
None	Species has no special status

Native

Yes	Species is native to California.
No	Species is not native to California.

SF Bay Residency

Fall	Species resident during Fall
Winter	Species resident during Winter
Spring	Species resident during Spring
Summer	Species resident during Summer
Transient	Species transient resident
All Year	Species resident all year

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Primary Exposure

The primary exposure description reflects the primary routes of exposure to contaminants for the species, excluding exposure through ingestion of contaminated prey.

Air	Air
Soil	Soil
Sed	Sediments
SW	Surface Water (including San Francisco Bay water)

Habitat/Presence

O	San Francisco Bay, open waters
W	Wetland areas
W	The habitat used for nesting is underlined in this column. Nesting is indicated only when confirmed.
G	Grassy areas sometimes with shrubs and small trees
H	Hard surfaces such as tarmac, gravel, pavement
IBW	Island breakwater
BW	Connected breakwater
B	Beach
RR	Rip-rap, most shore edges excluding small beaches
T	Trees near shooting range
P	Pier
*	Observed at NAS Alameda (Species not marked with an "*" are expected to occur at NAS Alameda).

Feeding Guild

Carnivore	Eats primarily animals.
Insectivore	Eats primarily insects.
Herbivore	Eats primarily plants.
Omnivore	Eats a combination of animals and plants.

References

California Department of Fish and Game (CFG). 1990. "California's Wildlife, Vol. 2, Birds." November.

CFG. 1994. "Special Animals." August.

CFG. 1994. "Endangered and Threatened Animals of California." October.

FWS. 1992. "Status and Trends Report on Wildlife of the San Francisco Estuary, San Francisco Estuary Project." January.

FWS. 1993. "Listed and Proposed Endangered and Threatened Species and Candidate Species that may occur in the Area of the Proposed Closure of Naval Air Station, Alameda, Alameda County, California (1-1-94-SP-192, December 31, 1993)." Enclosure attached to letter from Dale A. Pierce, USFW, to John H. Kennedy, Department of the Navy.

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY DIDELPHIDAE							
Virginia Opossum (3) *Didelphis virginiana*	None	No	All year	Yes	Soil, SW	G,W	Omnivore (carrion, insects, fruits, berries, earthworms, fungi)
FAMILY VESPERTILIONIDAE							
Townsend's Big-eared Bat (2) *Plecotus townsendii townsendii*	SSC, FC2	Yes	All year	Yes	Soil, SW	H, G	Insectivore (small moths, also beetles and soft-bodied insects)
FAMILY MOLOSSIDAE							
California Mastiff Bat (2) *Eumops perotis californicus*	SSC, FC2	Yes	All year	Yes	Soil, SW	H, G	Insectivore

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY SORICIDAE							
Vagrant Shrew (3) Sorex vagrans	None	Yes	All year	Yes	Soil, SW	G, W	Omnivore (invertebrates, insects, worms, snails, slugs, spiders, small mammals, fungi, roots, shoots, seeds)
FAMILY TALPIDAE							
Broad-footed Mole (3) *Scapanus latimanus*	None	Yes	All year	Yes	Soil, SW	G, W	Omnivore (earthworms, insects, spiders, centipedes, small mammals, crustaceans, seeds)
FAMILY LEPORIDAE							
Domestic Rabbit (1) *Oryctolagus cuniculus*	None	Yes	All year	Yes	Soil, SW	G, H, RR *	Herbivore
Black-tailed Hare (1,3) *Lepus californicus*	None	Yes	All year	Yes	Soil, SW	G, H, W *	Herbivore

TERRESTRIAL MAMMALS AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY SCIURIDAE							
California Ground Squirrel (1,3) *Spermophilus beecheyi*	None	Yes	All year	Yes	Soil, SW/ Burrows, requires little water	G, RR *	Omnivore (seeds, nuts, fruits, grasses, forbs, insects, eggs, carrion)
FAMILY GEOMYIDAE							
Botta Pocket Gopher (1,3) *Thomomys bottae*	None	Yes	All year	Yes	Soil, SW/ Burrows, requires little water	G, H *	Herbivore (roots, leaves, seeds, stems)
FAMILY CRICETIDAE							
Western Harvest Mouse (3) *Reithrodontomys megalotis*	None	Yes	All year	Yes	Soil, SW	G, W	Omnivore (seeds, insects, fruits, shoots)
Deer Mouse (3) *Peromyscus maniculatus*	None	Yes	All year	Yes	Soil, SW	G, W	Omnivore (seeds, fruits, leaves, fungi, insects, animal material)
Salt Marsh Harvest Mouse (2) *Reithrodontomys raviventris*	FE, CE	Yes	All year	Yes	Soil, SW	W	Herbivore (leaves, seeds, stems)

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
San Francisco Dusky-footed Woodrat (2) *Neotoma fuscipes*	SSC, FC2	Yes	All year	Yes	Soil, SW/ Forages on ground, in bushes, and in trees; requires little water	G	Herbivore (woody plants, also fungi, flowers, grasses, acorns)
FAMILY ARVICOLIDAE							
California Vole (3) *Microtus californicus*	None	Yes	None	Yes	Soil/ Burrows	G, W	Herbivore (grasses, sedges, herbs)
FAMILY MURIDAE							
House Mouse (3) *Mus musculus*	None	No	None	Yes	Soil, SW	W	Omnivore (grains, fruits, meat, arthropods)
Norway Rat (1,3) *Rattus musculus*	None	No	All year	Yes	Soil, SW/ Forages on ground; burrows	BW *	Omnivore (grains, fruits, eggs, insects, birds, mammals, garbage)

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY PROCYONIDAE							
Raccoon (1) *Procyon lotor*	None	Yes	All year	Yes	Soil, SW/ Associated with water	G, H *	Omnivore (Opportunistic: animal matter, grains, nuts, fruits)
FAMILY MUSTELIDAE							
Striped Skunk (1) *Mephitis mephitis*	None	Yes	All year	Yes	Soil, SW/ Burrows; digs for food	G, W, H *	Omnivore (Insects, small mammals and other vertebrates, eggs, crustaceans, fruits, seeds, carrion)
FAMILY FELIDAE							
House Cat (1) *Felis domesticus*	None	No	All year	Yes	Soil, SW	G, H, RR, T *	Omnivore

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Species (and reference)	Status	CA Native	SF Bay Residency	Breed	Primary Exposure/ Notes on Behavior	Habitat/ Presence	Feeding Guild
FAMILY CANIDAE							
Red Fox (3) *Vulpes vulpes*	None	Yes	All year	Yes	Soil/ Burrows		Carnivore (squirrels, gophers, mice, marmots, rabbits, birds, eggs, insects, carrion, fruits, earthworms)
FAMILY MUSTELIDAE							
Long-tailed Weasel (3) *Mustela frenata*	None	Yes	All year	Yes	Soil, SW/ Burrows	G *	Carnivore (mice, gophers, chipmunks, ground squirrels, rabbits, birds, insects, salamanders)

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Table Explanation

References for Occurrence

(1) Feeney, L.R., and L.D. Collins 1993. This document provides lists of mammal, bird, reptile, and fish species that have been observed at NAS Alameda based on the following sources:

Bailey, S.F., and Collins, L.D. 1983. "Annotated list of waterbirds of the Naval Air Station, Alameda." March.

Bailey, S.F. 1985. "A study of bird use of the breakwater island and breakwater gap area of the Naval Air Station, Alameda." Christmas Bird Counts conducted by volunteers of Golden Gate Audubon Socieity, 1984, 1985, 1987, 1988, 1990, 1992. Observations made during foraging and nesting surveys of California Least Terns at ANAS, various observers, for last several years.

(2) FWS. 1993. "Listed and Proposed Endangered and Threatened Species and Candidate Species that may occur in the Area of the Proposed Closure of Naval Air Station, Alameda, Alameda County, California (1-1-94-SP-192, December 31, 1993)". Enclosure attached to letter from Dale A. Pierce, FWS, to John H. Kennedy, Department of the Navy.

(3) PRC. 1994. "NAS Alameda Ecological Assessment (Draft)". February.

Status

Species of special conservation status, as registered in the California Department of Fish and Game's Natural Diversity Data Base, are indicated by the following codes.

SSC	California Department of Fish and Game (CFG) Species of Special Concern
CE	State of California Endangered Species
CFP	State of California Fully Protected Species
FE	Federal Endangered Species
FT	Federal Treatened Species
FC2	Federal Catergory 2 Species
MMPA	Protected under the Marine Mammal Protection Act
None	Species has no special status

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Native

Yes	Species is native to California.
No	Species is not native to California.

SF Bay Residency

All Year	Species resides in area all year.
Transient	Species spends a portion of year in area.
None	No data was found regarding residency duration at NAS Alameda during this preliminary search.

Breeding

Yes	Species breeds in area.
No	Species does not breed in area.
Blank	No data was found regarding breeding location at NAS Alameda during this preliminary search.

Primary Exposure

The primary exposure description reflects the primary routes of exposure to contaminants for the species, excluding exposure through ingestion of contaminated prey.

Air	Air
Soil	Soil
Sed	Sediments
SW	Surface Water (including San Francisco Bay water)

TERRESTRIAL MAMMALS
AT NAS ALAMEDA

Habitat/Presence

O	San Francisco Bay, open waters
W	Wetland areas
G	Grassy areas sometimes with shrubs and small trees
H	Hard surfaces such as tarmac, gravel, pavement
IBW	Island breakwater
BW	Connected breakwater
B	Beach
RR	Rip-rap, most shore edges excluding small beaches
T	Trees near shooting range
P	Pier
*	Observed at NAS Alameda (Species not marked with an "*" are expected to occur at NAS Alameda).
Blank	No data was found regarding habitat use or presence at NAS Alameda during preliminary search.

Feeding Guild

Carnivore	Eats primarily animals.
Herbivore	Eats primarily plants.
Insectivore	Eats primarily insects.
Omnivore	Eats a combination of animals and plants.

References

FWS. 1992. "Status and Trends Report on Wildlife of the San Francisco Estuary, San Francisco Estuary Project." January.

CFG. 1994. "Special Animals." August.

CFG. 1994. "Endangered and Threatened Animals of California." October.

APPENDIX B

SITE RECONNAISSANCE METHODOLOGY AND DATA FORMS

MEMORANDUM

TO: DOD/DOE AND SUPERFUND RPMS
FROM: BMS
RE: PROTOCOLS FOR SITE WALK REQUIREMENT FOR ECOLOGICAL ASSESSMENTS

The purpose of the Site Walk is to provide qualitative information on habitats, dominant and sensitive biota, potential pathways, and contaminants-of-concern for Phase I of the Ecological Assessment. The Ecological Assessment is an integral part of the Remedial Investigation process and is a requirement for investigation and cleanup under the CERCLA process. The results of the Site Walk will help focus later Phases of the Ecological Assessment, should these become necessary. The Site Walk is considered part of the facility-wide assessment. Please note that this approach does not use the "Hazard Quotient Method" to evaluate potential adverse ecological effects.

It is necessity to have close coordination among regulatory agencies, trustee agencies, and the PRP (DOD/DOE facility) in the form of "Scoping Meetings" for site-specific modifications of the Protocols, including the "Site Walk". It is important to note that the facility has federal resource trustee responsibilities under CERCLA and is required to coordinate with the State trustees whether or not the federal facility is listed on the National Priorities List (NPL). The workplan for the Site Walk should be developed within the context of a scoping meeting with regulatory and trustee agencies and the minutes of that meeting may serve as the Site Walk portion of the workplan document. This consensus approach may be used to accelerate the workplan development and review process.

The level-of-effort criterion should be based on the assumption that the data to be collected will be sufficient to make decisions regarding the Phase I Ecological Assessment Report and to decide whether and how to move on to the quantitative Phase II Ecological Assessment Workplan.

Definitions:

"Protocols" – minimum requirements for data collection and presentation for the Phase I, Qualitative Ecological Risk Assessment portion of a remedial investigation. This term is used to apply broadly to field investigation techniques and includes a visual inspection of the facility and sites on the facility that are under investigation ("Site Walk"). For additional information, the PRP/Facility is referred to: 1. EPA ECO-Updates (e.g., August 1992: Briefing the BTAG: Initial Description of Setting, History, and Ecology of a Site); 2. Superfund Program, Checklist for Ecological Assessment/Sampling, 26 January 1993; 3. Screening Checklist for: Ecological Assessment in the RI/FS Work Plan; 4. Screening

Checklist for: Ecological Assessment in the RI/FS Report; 5. Framework for Ecological Risk Assessment, February 1992.

"Facility" – refers to the entire base including separate holdings or commands unless there is a written agreement that defines the facility otherwise.

"Site" – refers to the areas in which contamination is suspected, or an operable unit, or some geographic subdivision of the facility.

Site Walk Protocols

MAJOR HABITAT GROUPS

The qualitative ecological risk assessment must address site-specific habitats of the following major groups and subgroups: 1. marine (estuarine) (waters and sediments); 2. terrestrial (forests, oak woodland, grasslands [Jepson prairie], vernal pools, riparian, lacustrine, palustrine, deserts, dunes, coastal chapparal, agriculture, landscape [golf courses]); transition zones (freshwater, saltwater and brackish wetlands, intertidal zone and mudflats, rivers, lakes, streams). Included in each of the major habitats should be consideration of sensitive threatened or endangered and migratory species. Sensitive species should be assumed to be present if suitable habitat exists, until demonstrated otherwise. However, consideration of just the sensitive species does not constitute a complete ecological assessment. Presented below are minimum data and data presentation requirements for a Phase I, Qualitative Ecological Assessment.

1. **Marine (estuarine) Habitats "Site Walk" Requirements**

a. Both water and sediments should be assessed. Assessment of the media includes published information about species that inhabit each medium (species lists), likely seasonal occurrence, food web information, etc.

b. Wet season and dry season sampling of each medium to determine local presence of ecological receptors. Both plant (micro- and macroalgae) and animal species should be sampled. Site-specific variations on seasonal sampling may be appropriate.

c. The decision about the level-of-effort requirements for trapping of fishes and other mobile ecological receptors should be made in coordination with regulatory and resource agency representatives in a Site Walk scoping meeting.

d. Who should participate: a State or federal agency representative. The following persons and areas of expertise are available to the facilities:

Denise Klimas, NOAA: (access to expertise in fish taxonomy, benthic community

structure analysis, anadromous fishes, marine mammals)

Michael Martin, California Department of Fish & Game: California fisheries and game resources (access to expertise in fish taxonomy, endangered species, benthic community structure, migratory birds).

Barbara Smith, SFRWQCB: algal taxonomy.

e. Notification: facilities should notify the State and/or federal RPMs and Trustee Agencies. Coordination with regulatory and trustee agencies should take place before finalization of the schedules for the Site Walk.

2. **Terrestrial Habitats Site Walk Requirements**

a. Both wet and dry seasons should be assessed. Where ecologic receptors are seasonally present in the habitat (migratory species, seasonal plants), the appropriate season should be assessed. The rationale for the timing of the site walk should be explained in the narrative for the Ecological Assessment.

b. A minimum of three time periods should be assessed: 1. dawn to 0900; 2. mid-morning; 3. sunset to evening.

c. The decision about sampling design (whether to perform the assessment on a grid versus transect and perimeter basis) should be made in coordination with regulatory and resource agency representatives in a Site Walk scoping meeting.

d. Who should participate: a State or federal agency representative. The following persons and areas of expertise are available to the facilities:

Roxy Barnett, USEPA: birds, mammals (access to other expertise including terrestrial plants).

Clarence Callahan, USEPA: terrestrial invertebrates.

James Haas, U.S. Fish and Wildlife Service: birds, plants, mammals, (access to herpetologist and endangered species expertise).

Michael Martin, Cal Fish & Game: (access to expertise in endangered species and California resources)

e. Notification: facilities should notify the State and/or federal RPMs and Trustee Agencies. Coordination with regulatory and trustee agencies should take place before finalization of the schedules for the Site Walk.

3. **Transition Zone Habitats Site Walk Requirements**

a. Each of the following types of transition zones should be assessed: marine (salt) marsh, mud flats; estuarine (brackish) marsh; riverine, palustrine, lacustrine, fresh water marsh.

b. Both water and sediments should be assessed. Assessment of the media includes published information about species that inhabit each medium (species lists), likely seasonal occurrence, food web information, etc.

c. Both wet and dry seasons should be assessed. Where ecologic receptors are seasonally present in the habitat (migratory species, seasonal plants), the appropriate season should be assessed. The reasons for the timing of the site walk should be explained in the narrative for the Ecological Assessment.

d. A minimum of three time periods should be assessed: 1. dawn to 0900; 2. mid-morning; 3. sunset to evening.

e. The decision about sampling design (whether to perform the assessment on a grid versus transect and perimeter basis) should be made in coordination with regulatory and resource agency representatives in a Site Walk scoping meeting.

f. Who should participate: a State or federal agency representative. The following persons and areas of expertise are available to the facilities:

Roxy Barnett, USEPA: birds, mammals (access to other expertise including wetlands plants).

James Haas, U.S. Fish and Wildlife Service: birds, plants, mammals, (access to herpetologist and endangered species expertise).

Denise Klimas, NOAA: (access to expertise in fish taxonomy, benthic community structure analysis, anadromous fishes, marine mammals)

Michael Martin, California Department of Fish & Game: California fisheries and game resources (access to expertise in fish taxonomy, endangered species, benthic community structure, migratory birds)

Barbara Smith, SFRWQCB: wetlands plants, algal taxonomy.

Deliverables

1. **MAPS**

a. Facility-wide habitat map. Show all major habitat types. USGS Quad map (1:25000), qualitative (as appropriate show canopies, shrubs, dominant herbs), use existing maps.

and

b. Facility-wide land use history map. Show current and historical land use (especially landfills, waste piles, firing ranges, strafing areas, burn pits, explosives areas, hazardous waste storage areas, etc.)

or

c. An overlay or combination of "a" and "b".

and, as appropriate,

d. Site-specific habitat map. As appropriate, show individual sites. Alter scale to suit each site, habitat, and likelihood of encountering ecological receptors. For industrial sites where future land use is industrial, commercial or residential, smaller site-scale maps may not be necessary.

The scale of maps. Map scale is dependent of the habitat type and the size of the site and facility. The future land use at the facility also should be considered such that industrial sites with continuing industrial use may have larger scale maps than those where sensitive habitats and receptors in these habitats are of primary concern. The If these maps are to be used as decision tools for "no further action" at a site, they should necessarily be on a finer scale. More accurate maps (finer scale) will be required in later Phases of the Risk Assessment, whether or not "no further action" was proposed. Maps that are consistent with "National Locational Data Policies" are proposed. Existing documents such as Soil Conservation Service Maps, County Maps, facilities' "Natural Resource Management Plans", and Agricultural Outlease maps are suggested as appropriate references.

2. TABLES

a. Summary table of contaminants and range of concentrations (this will vary with facility and site and how much is known at the time of the Phase I Eco-Risk Assessment).

and

b. Current and historical land use information. This table may accompany and more fully explain the land use history map in 1.b. or 1.c.

and

c. Summary table of potential receptors including the following additional information using known species lists as a base: species name; season(s) in which it is expected to be found on the facility; presence noted during the site walk (visual sighting (photograph), tracks (photograph), nest (photograph), call, scat, etc.); nocturnal or diurnal in habit.

3. DATA

a. Copies of data logs used during site walk to generate tables.

b. Copies of photographs used to document presence of ecologic receptors.

4. DATA ANALYSIS FOR PHASE I

a. Preliminary list of potential receptors

b. Preliminary list of potential pathways

c. Qualitative understanding of facility-specific habitats

d. Preliminary list of assessment endpoints

e. Preliminary list of measurement endpoints

f. Preliminary conceptual site model

g. Proposed hypotheses

h. Proposed data quality objectives

i. Proposed Phase II Work Plan, as appropriate

5. REFERENCES

The following list of references is provided so that techniques can be standardized and data may be comparable within and between facilities. Descriptions/designations provided in the facilities' Natural Resource Management Plans may need to be modified in accordance with the references presented below (e.g., U.S. Army Corps of Engineers wetland delineations may not be exactly the same as those using the Fish and Wildlife Service). The need for such modifications will be determined in coordination with the

resource trustees.

a. Terrestrial habitats
Mayer K.E. and Raudenslayer W.F., eds. 1988. A guide to wildlife habitats of California. California Department of Forestry and Fire Protection.

b. Aquatic and transitional habitats
Cowardin P.M., Carter V., Golet F.C., and La Rue E.T. 1979. Classification of wetlands and deep water habitats of the United States. U.S. Fish and Wildlife Service Office of Biological Services (FWS/OBS-79/31).

NAS ALAMEDA TERRESTRIAL SURVEY			Location:	Observation point:
			Biologist:	Date/Time:
			Weather Conditions:	
SPECIES **(include markings)**	**HABITAT**	**OBSERVED ACTIVITY**	**COMMENTS**	**COUNT**

NAS ALAMEDA THREATENED AND ENDANGERED PLANT SURVEY

Site Location: _____ Date: _____

Time of Survey: _____ Biologist: _____

Topo Quad name: _____

Weather Conditions:

Site Information: (current/surrounding land use, include visible disturbances or potential threats to vegetation)

Habitat Description: (describe plant communities, include % cover)

Overall habitat quality: ( )Excellent, ( )Good, ( )Poor

PLANT INFORMATION

1. List any potentially protected species observed onsite
2. Include phenology (% vegetative, flowering, or fruiting)
3. Record descriptions, including fitness and photograph each species.

Checklist for Ecological Assessment/Sampling

I. SITE DESCRIPTION

Draft Copy

Date_____

1. Site Name: _____

   Location: _____

   _____

   County: _____ City: _____ State: _____

2. Latitude: _____ Longitude: _____

3. What is the approximate area of the site? _____

4. Is this the first site visit? ☐ yes ☐ no If no, attach trip report of previous site visit(s) if available.

   Date(s) of previous site visit(s): _____.

5. Please attach USGS topographic map(s) of the site to the checklist, if available.

6. Are aerial or other site photographs available? ☐ yes ☐ no If yes, please attach any available photo(s) to the site map at the conclusion of this section.

7. The land use on the site is:

____% Urban

____% Rural

____% Residential

____% Industrial(☐ light ☐ heavy)

____% Agricultural

(Crops:_____)

____% Recreational

(Describe: note if it is a park, etc.)

_____

_____

____% Undisturbed

____% Other

The area surrounding the site is:
_____ mile radius

____% Urban

____% Rural

____% Residential

____% Industrial (☐ light ☐ heavy)

____% Agricultural

(Crops:_____)

____% Recreational

(Describe: note if it is a park, etc.)

_____

_____

____% Undisturbed

____% Other

8. Has any movement of soil taken place at the site? ☐ yes ☐ no. If yes, please identify the most likely cause of this disturbance:

____ Agricultural Use ____ Heavy Equipment ____ Mining

____ Natural Events ____ Erosion ____ Other

Please describe:

Draft Copy

Date_____

9. Do any potentially sensitive environmental areas exist adjacent to or in proximity to the site, e.g., Federal and State parks, National and State monuments, wetlands, prairie potholes, etc.? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information.*

9a. Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

Draft Copy

Date_____

10. What type of facility is located at the site?

☐ chemical ☐ manufacturing ☐ mining ☐ waste disposal

☐ other (specify)_____

11. What are the suspected contaminants of concern at the site? If known, what are the maximum concentration levels?

12. Check any potential routes of off-site migration of contaminants observed at the site:

☐ swales ☐ depressions ☐ drainage ditches

☐ runoff ☐ windblown particulates ☐ vehicular traffic

☐ other (specify)_____

13. If known, what is the approximate depth to the water table?_____

14. Is the direction of surface runoff apparent from site observations? ☐ yes ☐ no If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

☐ surface water ☐ groundwater ☐ sewer ☐ collection impoundment

15. Is there a navigable waterbody or tributary to a navigable waterbody? ☐ yes ☐ no

16. Is there a waterbody anywhere on or in the vicinity of the site? If yes, also complete Section III: Aquatic Habitat Checklist – Non-Flowing Systems and/or Section IV: Aquatic Habitat Checklist – Flowing Systems.

☐ yes (approx. distance_____) ☐ no

17. Is there evidence of flooding? ☐ yes ☐ no. *Wetlands and flood plains are not always obvious; do not answer "no" without confirming information.* If yes, complete Section V: Wetland Habitat Checklist.

18. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. [Use the back of this page if additional space for text is needed.]

19. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ yes ☐ no *If yes, it is required to verify this information with the U.S. Fish and Wildlife Servic.* If species' identity is known please list them below.

20. Weather conditions at the time this checklist was prepared.

DATE:_____

_____ Temperature (°C/°F)

_____ Normal daily high temperature

_____ Wind (Direction/Speed)

_____ Precipitation (rain, snow)

_____ Cloud cover

Draft Copy

Date_____

1A. SUMMARY OF OBSERVATIONS AND SITE SETTING

Draft Copy

Date_____

Completed by_____ Affiliation_____

Additional Preparers_____

OSC_____

Date_____

II. TERRESTRIAL HABITAT CHECKLIST

IIA. WOODED

1. Are there any wooded areas at the site? ☐ yes ☐ no. If no, go to Section B: Shrub/Scrub.

2. What percentage or area of the site is wooded? (____% ____ acres). Indicate the wooded area on the site map attached to a copy of to this checklist. Please identify what information was used to determine the wooded area of the site.

3. What is the dominant type of vegetation in the wooded area? (Circle one: Evergreen Deciduous Mixed) Provide a photograph, if available.

   Dominant plant, if known: _____

4. What is the predominant size of the trees at the site? Use diameter at breast height.

   ☐ 0-6 in. ☐ 6-12 in. ☐ > 12 in.

5. Specify type of understory present, if known. Provide a photograph, if available.

IIB. SHRUB/SCRUB

1. Is shrub/scrub vegetation present at the site? ☐ yes ☐ no If no, go to Section C: Open Field.

2. What percentage of the site is covered by scrub/shrub vegetation? (____% ____ acres). Indicate the areas of shrub/scrub on the site map. Please identify what information was used to determine this area.

3. What is the dominant type of scrub/shrub vegetation, if known? Provide a photograph if available.

4. What is the approximate average height of the scrub/shrub vegetation?

   ☐ 0-2 ft. ☐ 2-5 ft. ☐ > 5 ft.

Draft Copy

Date_____

Date_____

5. Based on site observations, how dense is the scrub/shrub vegetation?

☐ dense ☐ patchy ☐ sparse

IIC. OPEN FIELD

1. Are there open (bare, barren) field areas present at the site? ☐ yes ☐ no If yes, please indicate the type below:

☐ prairie/plains ☐ savannah ☐ old field ☐ other (specify)_____

2. What percentage of the site is open field? (____% ____ acres). Indicate the open fields on the site map.

3. What is/are the dominant plant(s)? Provide a photograph, if available.

4. What is the approximate average height of the dominant plant?_____

5. Describe the vegetation cover: ☐ dense ☐ sparse ☐ patchy

IID. MISCELLANEOUS

1. Are other types of terrestrial habitats present at the site other than woods, scrub/shrub, and open field? ☐ yes ☐ no If yes, identify and describe them below.

2. Describe the terrestrial miscellaneous habitat(s) and identify these area(s) on the site map.

3. What observations, if any, were made at the site regarding the presence and/or absence of insects, fish, birds, mammals, etc.?

4. Review the questions in Section I to determine if any additional habitat checklists should be completed for this site.

Date

APPENDIX C

TABLE OF THREATENED AND ENDANGERED SPECIES EXPECTED TO OCCUR AT NAS ALAMEDA

APPENDIX C

TABLE OF THREATENED AND ENDANGERED SPECIES EXPECTED TO OCCUR AT NAS ALAMEDA

Species (and reference)	Status	CA Native	San Francisco Bay Residency	Habitat/ Primary Exposure	Feeding Guild
California Brown Pelican *Pelecanus occidentalis californicus*	FE CE CFP	Yes	Transient	Air, Soil, Sediment, Surface Water	Carnivore Mainly fish, occasionally crustaceans, carrion, and young of its own species
Double-crested Cormorant *Phalacrocorax auritis*	SSC	Yes	All year	Air, Surface Water Dives to catch prey. Roosts on shore.	Carnivore Mainly fish, also crustaceans and amphibians
Salt marsh Harvest Mouse *Reithrodontomys raviventris*	SE FE	Yes	All year	Soil, Surface Water, Air Coastal salt marsh, nocturnal, drinks sea water	Herbivore Mainly seeds and fruits of wild plants.

Status:

SSC California Department of Fish and Game (CFG) Species of Special Concern
CE State of California Endangered Species
FE Federal Endangered Species

TABLE OF THREATENED AND ENDANGERED SPECIES EXPECTED TO OCCUR AT NAS ALAMEDA

Primary Exposure

The primary exposure description reflects the primary routes of exposure to contaminants for the species, excluding exposure through ingestion of contaminated prey.

References

California Department of Fish and Game (CFG). 1994a. "Natural Diversity Data Base: Special Plants List." Natural Heritage Division. August.

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